SELF-EFFICACY AND CHILDHOOD ASTHMA: AN INVESTIGATION OF PSYCHOLOGICAL FACTORS

by

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A thesis submitted in part fulfilment
of the requirements for the degree of

Doctorate in Clinical Psychology.

University of Edinburgh

August 2001

Acknowledgements

I would like to express my gratitude to Dr. Ruth Thomson and Dr. Chris Wiles for all their help, advice and encouragement throughout all stages of my study.

My appreciation goes to the team at the Rowan Centre and the Paediatric Department for their continuing support throughout the year.

I am also grateful to all the children and their parents who participated in my study - especially during their school holidays!

A very special thank-you is awarded to my family and friends, whose support and inspiration has ensured my survival during the last three years. A particular mention goes to Dan and Poppy, my motivators, who have provided me with much amusement and fun-filled diversions and whose endurance and patience are to be commended.

Declaration

" This thesis has been composed by myself, and the work herein is my own"

J. Tracy Slater

Contents

ABSTRACT

Childhood asthma is a chronic condition affecting up to one in every seven children. Self-management programs have been developed to help improve children's abilities to both manage and cope with their asthma. If these programs are to be fully effective, an understanding of the psychological factors that influence children's sense of competence to manage their condition is required.

This study aimed to identify psychological variables that may influence children's asthma self-efficacy including children's health locus of control, child's attitudes toward illness and children's level of anxiety. The relationship between children's level of asthma knowledge and their sense of competence to manage the illness was explored. The importance of parent's level of asthma knowledge and parent asthma self-efficacy was also examined in relation to children's level of asthma self-efficacy.

The study adopted a within group cross-sectional approach. Children aged 7-15 years of age with asthma were invited to participate in the research. Data were collected on 71 children and their parents based on self-report measures rating child and parent asthma self-efficacy and asthma knowledge, child health locus of control, child attitudes toward illness and anxiety. A correlational design was employed to test for associations and relationships between children's asthma self-efficacy and the factors noted above.

Results will be given and discussed with reference to previous research findings with conclusions reached.

1. INTRODUCTION

Asthma, a chronic condition, is the most common respiratory disease in children (Creer & Bender, 1993). It is influenced by biological, environmental, psychological and social factors. In order to control and manage childhood asthma, children and their parents require access to medical treatment, education, a degree of environmental control and self-management training.

Numerous studies have illustrated the impact that self-management programs can have for asthmatic children in terms of increasing asthma knowledge and self-management abilities, whilst improving overall quality of life (Parcel, Nader & Tiernan, 1980; Perez, Feldman & Caballero, 1999) . These programs have also been shown to reduce the number of hospitalisations and emergency visits these children require and hence reduce the amount of school missed through asthma. There have been significant advances in the treatment of childhood asthma during the last two decades but significant morbidity associated with the disease remains (Heermann & Willis, 1992). Children with asthma continue to achieve less than optimum control of their asthma and experience frightening and unpleasant symptoms and attacks.

Self-management programs can place great demands on the individual as suggested by Christie, French, Weatherstone & West (1991). Children's attitudes to their illness, their beliefs about their health, as well as their knowledge are important factors in determining the extent to which they are able to successfully carry out self-management behaviours, and hence their degree of self-efficacy. The crux of any efforts to control asthma should be the performance of self-management skills by the individual themselves, with the result of making a significant contribution to the

control of their disorder. This study aims to examine which of the above factors influence children's asthma self-efficacy.

1. 1 Chronic Illness – An introduction to Childhood Asthma

The definition of a chronic illness is defined as (1) interferes with daily functioning for more than three months in a year; or (2) causes hospitalisation lasting more than one month in a year; or (3) is thought at the time of diagnosis to be likely to do either of the preceding (Pless & Pinkerton, 1975).

Therefore, chronic illness can affect children for lengthy periods of time, and often for the rest of their lives. Many conditions appear at birth or in the early developmental years, although some appear at varying ages throughout childhood or adulthood. Chronic illness cannot generally be cured, but can be managed to the point of providing relief for the sufferer by achieving fewer exacerbations or by a reduction of symptoms of the illness. Examples of chronic physical conditions are asthma, cerebral palsy, congenital heart disease, cystic fibrosis, diabetes, haemophilia, leukaemia, sickle cell diseases and spina bifida.

This study is concerned with childhood asthma and self-efficacy. It investigates factors that may influence children's beliefs about their ability to carry out and their expectations of self–management behaviours.

1.1.1 Definition of Asthma

Asthma is a condition that affects the airways – the small tubes that carry air in and out of the lungs. Children with asthma have airways that are almost always swollen

and inflamed. When these inflamed airways come into contact with an asthma trigger, symptoms of asthma appear. Asthma symptoms include coughing, wheezing, a tight chest and getting short of breath.

Common triggers are colds or flu, cigarette smoke, exercise and allergies to pollen, furry or feathery animals or house-dust mite. When a child comes into contact with an asthma trigger, the muscle around the walls of the airways tightens so that the airway becomes narrower. The lining of the airways becomes inflamed and starts to swell. Often sticky mucus or phlegm is produced. As the airways narrow, it becomes increasingly difficult for air to move in or out, leading to the asthmatic child starting to wheeze or cough.

"Asthma is a lung disease with the following characteristics: (1) airway obstruction (or airway narrowing) that is reversible (but not completely so in some patients) either spontaneously or with treatment; (2) airway inflammation; and (3) airway hyperresponsiveness to a variety of stimuli" (National Institutes of Health, 1991).

People with asthma sometimes find it hard to breathe. They often cough, wheeze or feel tightness across their chest. Some children have described asthma as feeling like "someone is standing on my lungs" and " it feels like I am being squashed". Other children have described an asthma attack as feeling like a rope is being slowly tightened around their chest (National Asthma Campaign, 1995).

Developing an operational definition of what is referred to as an asthma attack or a flare-up requires the agreement of medical personnel, behavioural scientists, patients and in the case of children, their parents (Creer, 1992a).

1.1.2 Prevalence

Asthma is the most common chronic illness in children today (Creer & Bender, 1993). The National Asthma Audit of 1997/98 reported that around 3.4 million people in the United Kingdom have asthma including 1.5 million children. This figure suggests that one in seven children have asthma. There has been an increase in asthma related hospital admissions with the figure doubling for school-aged children and quadrupling for pre-school children. For example, between 1980 and 1985 the hospital admissions for children with asthma aged 0-4 years increased by 124 per cent, by 84 per cent for those aged 5-9 years and by 56 per cent for children aged 10 to 14 years.(Price, 1994). Along with other respiratory disorders and diseases, asthma accounts for up to 25 per cent of all limitations of activity in childhood (Newacheck, Budetti & Halfon, 1986).

1.1.3 Mortality

During the 1980s, mortality due to asthma increased by 6.2 per cent per year, increasing faster among those aged five to fourteen years (Creer & Bender, 1993). Research indicates that asthma is on the increase. In one study reported by the National Asthma Campaign (1997), the number of children reporting an asthma attack in the last year was almost three times as high in the year 1992 as it had been in the year 1982. Price (1994) suggested that death rates have fluctuated but have not

shown any decline. In real terms this means that about forty children die of asthma each year, mortality being highest between the ages of ten to fifteen years.

1.1.4 Characteristics of Asthma

Asthma attacks can occur on an intermittent basis, are variable and may reverse spontaneously or as a result of medication, they may also vary independently between patients and over time, within the same patient (Creer, Stein, Rappaport & Lewis, 1992). Thus, the main characteristics of the disorder are its intermittent, variable and reversible nature. Also characterising asthma are airway hyperresponsiveness and airway inflammation.

1.1.5 Diagnosis

The aetiology of childhood asthma as noted by Pearson in 1991 was not then precisely known (Pearson, 1991). Ten years on, and this remains the case. The diagnosis of asthma is based upon the patient's medical history, physician examination, chest x-rays, pulmonary function tests, peak flow monitoring and allergy skin testing to identify possible asthma triggers. These tests alone or in combination confirm the diagnosis of asthma and rule out other lung problems. It has often been thought that most children will 'grow out of' their asthma symptoms. However, recent research has shown that only about one in three children with asthma completely lose the condition, as they grow older. A further third of children describe a fluctuating course whereby their asthma significantly improves during adolescence, but recurs in early adult life (National Asthma Campaign, 1997).

1.1.6 Medical Treatments

The current treatment approach primarily entails the use of two types of medications. Relievers, to control acute episodes of asthma and preventers, are used for maintenance therapy. Relievers are medicines taken immediately when asthma symptoms appear. They quickly relax the muscles surrounding the narrowed airways. This allows the airways to open wider making it easier to breathe again. However, relievers do not reduce the swelling in the airways. Preventers protect the lining of the airways. They calm inflammation in the airways and reduce sensitivity to triggers. This means that they're less likely to react badly when they come across an asthma trigger. The reader is directed to Ayres (1997) for more extensive information on the diagnosis and medical treatments of asthma.

1.1.7 Psychological Factors and Asthma

Psychological factors play a central role in the onset of asthma, the expression and the escalation of its symptoms and its response to medical treatment. Asthma was once regarded as primarily an emotional disorder (French & Alexander, 1941), although it is now well recognised as a lung disorder, with predominantly physical symptoms. However, according to the transactional model purported by Creer and colleagues (1992), abnormal physiological processes can interact with psychological processes to direct the course of asthma. Hence, successful treatment of the disorder must combine medical and psychological interventions.

Investigators have repeatedly shown that psychological distress can disrupt normal immunological functioning (Creer & Bender, 1993). Emotional responses have long been recognised as triggers that can initiate an asthmatic response. In 1963, Purcell

illustrated that affective arousal; including crying, laughing, or general excitement can produce an asthmatic episode.

1.1.8 The Psychological Impact of Asthma on Children

Childhood asthma is recorded as being responsible for the greatest number of school days lost due to the condition than any other illness (Wells, 1994). Some studies have shown significant levels of academic under-functioning in asthmatic children as a result of school absences due to asthma (Rachelesfsky, 1986). For many children the impact of their asthma can extend to their physical and social spheres. For example, Schlosser and Havermans (1992) reported that a third of all adolescents with asthma in their sample reported being less involved in peer group activities such as dancing and going to clubs. On the other hand, other studies (Routon & Sherrill, 1989) found little evidence of differences in activities participated in or the level of enjoyment had, suggesting that some asthmatic children adapt their lifestyles to fit with their limitations with much more ease than others. This difference in ability to adapt to asthma may influence self-efficacy and the use of self-management techniques.

Asthma is a stressful and distressing illness. Several studies have attempted to identify the nature of the distress that children experience. Usherwood, Srimgeour & Barber (1990) found that the majority of children rated respiratory symptoms as the item to be most distressing and "burdensome" to them, with associated feelings of frustration, fear and anger. Eiser, Town & Tripp (1989) reported children to give extremely negative accounts of their feelings about having asthma. These included a fear about dying, not being able to take part in certain activities, missing out, and not being able to have pets. This study found that the social impact of asthma for

children with the condition was often articulated as negative, with children noting that they had been teased and embarrassed when they wheezed or had to use their inhalers in front of others. Ability to control asthma symptoms appears to be an important factor and Staudenmayer (1982) and Kashani, Koenig, Shepperd, Wilfly & Morris (1988) noted that psychopathology is higher in children who have poor control over their asthma, irrespective of severity. This might suggest that children with low self-efficacy would have associated higher levels of anxiety and hold negative attitudes towards their illness.

Other research has not found any significant differences on measures of psychological adjustment such as self-esteem and self-perception when comparing children with asthma with healthy matched controls (Ostrov & Ostrov, 1986). Perrin, Maclean & Perrin (1989) found that overall psychological adjustment of asthmatic children was comparable with that of healthy children. Norrish, Tooley & Godfrey (1977) when measuring psychological health also found no differences between children with asthma and the general population with regard to emotional difficulties. Indeed, Creer et al (1992) have suggested that there might be positive effects for children who are coping and can see that they are managing their symptoms successfully. These studies show that, similar to other chronic disorders, that the amount of variability in the way that children respond to their asthma is significant.

1.1.9 Severity of Asthma

There is the suggestion that the more severe the asthma, the more likely it is that the child will show signs of psychological disturbance (Eksi, Molzan, Savasir & Guler 1995). However, Steinhausen, Schindler & Stephan (1983) showed that severity of

the illness was not a significant factor in predicting psychopathology among asthmatic patients. Perrin et al. (1989) investigated the relationship between the severity of illness and psychological adjustment in 46 children with asthma and concluded that children at all levels of severity may demonstrate problems of adjustment. Mrazek (1986) suggested that although the severity of asthma is important to consider, the criteria used to define the "severity" of the condition are often unclear in studies. Mrazek recommended the use of the Pearlman-Bierman classification system to measure the severity of illness (Pearlman & Bierman, 1988).

Nevertheless, it has been shown by Perrin et al (1989) that the mother's estimate of the severity of her child's condition is a significant predictor of adjustment difficulties. This study found that children who were rated as having 'moderate' asthma had poorer adjustment scores than children rated as having either perceived 'mild' or 'severe' asthma.

1.1.10 Duration of Illness

Eksi et al. (1995) categorised the children in their study into groups according to the duration of their illness. They were categorised as short duration (less than 3 years) and long duration (3 or more years). The results of this study found there to be no relationship between the severity or the duration of the illness and psychological adjustment, including internalising, externalising, total problem and social competency scores of asthmatic children.

1.1.11 Adherence to treatment

Although there has been considerable advances in the medical treatments of childhood asthma, many children continue to suffer from frightening and unpleasant asthma symptoms and attacks, never achieving optimum control of their condition (Eiser & Havermans, 1994). One of the reasons that optimum control is never reached may be due to non-adherence to medication regimes (Lemannek, 1990). Other reasons for non-adherence suggested by Lemanek (1990) include beliefs that medication is ineffective, denial, and peer pressure, lack of knowledge or perception of the condition itself. Patients with chronic illness frequently feel anger and injustice about being ill. Declining and refusing medication is a way of expressing their sense of injustice. Some studies have shown that only about half of patients follow treatment as advised by their doctors. Creer (1992b) found the average compliance rate to be 43 per cent, with a wide range from 2 per cent to 100 per cent when he compared various studies on compliance with medication regimes in children with asthma. Hilton (1994) reported that only 27 per cent of asthmatic adolescents were taking their 'preventer' medications and 12 per cent were taking no medications at all. It is noted that older children may be less compliant with their medication regimes (Christiaanse, Lavigne & Lerner, 1989). Lemanek (1990) reported problems with the use of reliever medications in childhood asthma including over-use, under-use and uninformed use. Research has shown there to be very few relationships between adherence and demographic factors, duration or severity of illness (Smith, Seale, Ley, Shaw & Bracs 1986).

The failure of such improved medications and medical treatments to reduce the morbidity associated with asthma has led to the development of a range of

interventions that focus on patient education and self-management (Hilton, 1994). The focus on providing patients with knowledge has arisen through studies that support the view that children do not know enough about their asthma or how to manage it. Eiser et al. (1989) found that in a sample of asthmatic children and adolescents aged 7-16 years, that the majority of them had little understanding about the triggers of attacks or knowledge about what they would need to do to avoid attacks or indeed how to bring an attack under control.

1.1.12 Summary

Childhood asthma is a common chronic illness, causing significant morbidity and even mortality. Characterised by airway hyperresponsiveness and inflammation, the intermittent and variable nature of the disorder is described. Current treatment primarily entails the use of two types of medications, namely 'relievers' and 'preventers'.

It is recognised that psychological factors play a role in the onset and escalation of asthmatic symptoms and its response to medical treatment. The psychological impact of asthma appears to extend to many spheres of a child's life. Asthma can be a stressful and distressing illness for some children. However, the impact that severity of the condition or duration of the illness has on psychological adjustment or disturbance is unclear. Nevertheless, given the improved treatments for asthma, it seems to remain the case that many children never achieve optimal control of their condition. In an attempt to reduce such morbidity associated with asthma, a range of interventions that focus on patient education and self-management have been developed.

1.2 Self-Management

1.2.1 Concepts of Self-Management

The concepts that make up 'self-management' lie in behavioural and social learning theory. Skinner (1953) was one of the first theorists to postulate that self-control be used to determine a person's behaviour. In line with his approach to human behaviour, Skinner backed the idea to use environmental cues to direct and manage behaviour. Such techniques are especially important in relation to asthma self-management, particularly with regard to developing an environment aimed at increasing the likelihood that an individual will be able to avoid attack triggers and comply with their medication regimens. The main drive however behind self-management has arisen through more recent theoretical frameworks such as Bandura's social and cognitive learning theory (1977a, 1986). As such, the concepts of the learning/performance distinction and reciprocal determinism in relation to asthma self-management will be briefly discussed.

Learning/performance distinction

The concept of the learning/performance relationship is a fundamental and basic assumption behind learning theory. Learning refers to changes in an individual following some method of educational intervention. An example of learning would include teaching self-management skills to patients with asthma. Performance, on the other hand, refers to the interpretation and translation of learning into actual behaviour. For the child with asthma, this would mean the application of self-management skills to control asthma. Since the efficacy of a self-management program depends on the child/patient acting on their new knowledge, the distinction between learning and performance is a vital consideration in a condition such as

asthma. Much of what is learned is not carried out straightaway and is in fact performed at a later time when an asthma attack occurs.

Reciprocal determinism

The notion of reciprocal determinism relates to a self-management model in which personal and environmental factors function as interlocking determinants of one another (Bandura, 1977a). The interactive system that operates is represented by the cognitive and physiologic factors of an individual, their physical and social environment, as well as the individual's overt actions and behaviours. Influence appears to operate as multidirectional. An event both acts and reacts, often impacting upon the likelihood of that event occurring again and other events (Thoresen & Kirmil-Gray, 1983). Thoresen & Kirmil-Gray (1983), also social and cognitive learning theorists, suggest that this standpoint advocates that cognitive, physiologic, environmental and behavioural sources of influences ought to be studied together and in with regard to the other.

These two concepts of social learning (cognitive) theory are well placed to explain their role in the main areas of asthma care: the prevention of attacks; the detection and management of asthma attacks; and in reducing the amount of negative costs associated with the disorder.

1.2.2 Self-Management programmes

Behavioural interventions to assist the asthmatic child fall into 2 categories: (1) prevention and management and (2) self-management skills. Prevention involves such strategies as medication compliance, prediction of attacks, and preparation for

attacks. Management of asthma attacks involves dealing with issues such as symptom discrimination, medication use, panic, hospital overuse, relaxation and biofeedback. Three patient variables that affect self-management skills are knowledge of asthma and its treatment, motivation for change, and performance of self-management skills (Creer, 1991). Motivation could be considered to be a function of the attitudes and expectations of patients, in that if they believe that complying with medical advice will lead to improved health, they are likely to conform. If they believe otherwise, they are likely to be noncompliant.

Asthma education has become an essential component in the medical treatment of childhood asthma, given the increased recognition of the patient's important role in management of chronic disease. During the past 20 years, a number of self-management programs have arisen around the world (Fireman, Friday, Gira, Vierthale & Michaels, 1979; Gebert, Huemmelink, Koenning, Staab, Schmidt, Szczepanski, Runde & Wahn, 1998; Klingelhofer & Gerschwin,1988).

These programs vary in the technique they use, but have a common theme; to assist the children (and their parents) to develop improved management skills in both preventing and treating asthma attacks. Training is intended to improve patient adherence to medical treatment and to assist families to work with their doctors in devising appropriate and acceptable management plans that suit both child and parents.

The educational package that generally follows these programs includes the following elements: awareness of potential asthma management difficulties,

decision-making and appropriate action when these difficulties arise and the practice of effective behaviours (Brazil & McLean, 1997). In addition to these aspects, McNabb, Wilson-Pessano & Jacobs (1986) have identified behaviours that demonstrate the requirement for children to be able to manage the social aspects of having asthma, such as dealing with peers.

Such health education programs for children with asthma have found; significant increases in knowledge level, changes in asthma management behaviour, reduction in illness anxiety, positive change in health locus of control, and less use of health service resources. (Colland, 1993; Deaves, 1993; Parcel et al, 1980).

Shibutani and Iwagaki (1990) described a self-management program for asthmatic children and their families in Japan and found that the programs reduced the frequency and severity of asthma attacks, increased school attendance and participation in group activities whilst also increasing self-confidence and independence. An intervention project for children and families designed to promote health education and increase self-management indicated increased independence and responsibility for daily health care in the intervention group (Tal, Gil-Spielberg, Antonovsky & Tal, 1990).

Spencer, Atav, Johnston & Harrigan (2000) reported on the Open Airways for Schools program (OAS), which was applied in New York State. Forty schools were involved in the project. The purpose of the OAS program was to assist children in managing symptoms and feelings about asthma and helping parents to effectively manage their child's asthma. The project verified that the OAS program had a

significant effect on both the parents' and the children's asthma management behaviours.

Living with Asthma is a popular self–management program developed by Creer, Backial, Burns & Leung (1988). The authors report on the origins of the program in the Children's Asthma Research Institute and Hospital, a residential treatment centre in Denver, Colorado. The theory behind the program rests heavily on social learning theory, particularly two major concepts as previously described: the notion of reciprocal determinism and the learning/performance dichotomy. This program has proved highly effective in significantly improving the knowledge of asthma in parents and their children, and in developing positive attitudes in both groups.

Perez and collegues (1999) evaluated the effects of a self-management educational program on 29 children (aged 6-14 years) and their parents who were assigned to either an experimental or control group. Children's asthma knowledge, self-management abilities, index morbidity, and parents' asthma knowledge and management abilities were measured. The program consisted of six educational sessions and cognitive-behavioural strategies for the children, whilst parents received two talks and an information brochure. This educational package was adapted from several well-known American self-management programs including Superstuff (Weiss & Hermalin, 1987) and Living with Asthma (Creer et al, 1988).

These programs are devised from the Expanded Cognitive Social Learning Model, which states that, "there is a reciprocity and interdependence between cognition,

physiology, social and physical environment, and behaviour" (Thoresen & Kirmil-Gray, 1983).

Results indicated that the experimental group showed significant improvements in children's asthma knowledge and practice of self-management abilities and in parents' knowledge compared to the control group. Thus, improvements in asthma management skills and knowledge in both children and their parents were achieved through the more active use of information and cognitive-behavioural interventions.

However, Rubin, Bauman & Lauby (1989) noted that the relationship between asthma knowledge and recommended management behaviours is non-linear. Accurate knowledge of asthma is related to performing in more asthma management skills but only to a moderate level of knowledge, and is not sufficient to increase management behaviours alone.

1.2.3 Evaluating Self-Management Programs

Self-management programs have emphasised the importance of education. However, the results from the research reviewed imply that, the relationship between knowledge and successful self-management is not completely clear. Behavioural programs have shown significant improvements in asthma control, but when programs involve several components including education, cognitive and behavioural strategies and symptom recognition, it becomes increasingly difficult to establish which components are responsible for any change and indeed what it is that does change. It would appear to be the case that other important factors that act as

obstacles or aid in achieving effective self-management are not addressed in these programs.

Given that present-day treatment of asthma is increasingly focused on children as the principal managers of their illness, it would make sense that children's insights and perceptions become an important source of information to parents and health care professionals alike. It is possible that the beliefs a child has about their health and their attitudes towards having asthma have an effect on a child's willingness and ability to carry out appropriate self-management skills and hence make use of such intervention programs. The level of anxiety a child has may also influence their ability to perform self-management skills.

1.2.4 Psychological Factors influencing Self-Management

Childhood asthma does not occur in isolation and occurs within family and social networks, which in turn will have impact upon children's self-management abilities and their outcome. This study focuses primarily on a child-centred approach and as such will concentrate on individual factors that may influence asthma self-efficacy, i.e. children's sense of competence to manage their illness. These include health locus of control, anxiety, child attitude to illness and asthma knowledge. A secondary analysis of parental factors including asthma knowledge and parent self-efficacy will also be considered in relation to children's asthma self-efficacy as part of this study.

1.2.5 Summary

The concepts of self-management, which postulate that self-control be used to determine a person's behaviour, are derived from behavioural and social learning

theory. Particular attention is given to the concepts of learning/performance distinction and reciprocal determinism with regard to the prevention of asthma attacks, the detection and management of attacks and in reducing negative costs associated with the disorder.

Many self-management programs have been developed and a number of these are described. The programs vary in their technique, but they have a common theme, which is to assist children and parents to develop improved management skills in both preventing and treating asthma attacks. Self-management programs have emphasised the importance of education, although the relationship between knowledge and successful self-management is unclear. It seems that other factors need to be considered in achieving effective asthma self-management. It is suggested that children's beliefs and attitudes may be an important source of information in improving self-management skills. Parental factors are also considered.

1.3 Self-Efficacy

1.3.1 The Concept of Self-Efficacy

The introduction of the self-efficacy concept in 1977 (Bandura, 1977b) arose from several historical trends. One trend, central to the Social Cognitive (formerly called "learning") Theory that generated self-efficacy, was an increasing emphasis on persons as self-reflective agents rather than merely passive recipients of environmental forces (Bandura, 1977a, 1978). Along with the increasing acceptance of mutual effect between an individual and their environment was the development of interest in personal competencies and self-regulation (Mischel, 1990).

Self-efficacy beliefs concern one's abilities to perform in designated behavioural domains. Domain specificity is central to efficacy and is perhaps the aspect of this theory that most clearly sets it apart from other cognitive perspectives on health. While efficacy expectations may generalise to areas that are perceived to require skills similar to those required by the target behaviour, efficacy expectations in different spheres of life are largely independent (O'Leary, 1992). For example a person may have no difficulties with air travel but have many concerns with public speaking.

Also central to Social Cognitive Theory are outcome beliefs regarding the consequences of behaviours once successfully performed. Other theories that have been linked to health behaviour include the health belief model (Hochbaum, 1958; Rosenstock, 1968) and the theory of reasoned action (Ajzen, 1985; Ajzen & Madden, 1986). Expected outcome provides the motivational impetus for gaining skills and putting them into use, and this is a necessary, although not sufficient, factor in the adoption of many health behaviours.

Efficacy judgements can be readily enhanced by providing the opportunity for graded mastery experience, usual goal setting and modelling of success by similar others (Bandura, Adams, Hardy & Howells, 1980).

Thus this far in discussion of Social Cognitive Theory, it has been established that verbal modelling or information on its own is not enough for the adoption of a new behaviour. The concept of efficacy expectations has been introduced. The notion has been put forward that the probability that a person will perform a behaviour is related

to the person's beliefs that they have the knowledge and ability to carry out the behaviour (self-efficacy), and that the performed behaviour will result in beneficial outcomes (treatment efficacy).

Efficacy beliefs influence behaviour through their effects on behavioural choice, effort, expenditure, distress responses to difficult conditions, and persistence in tackling problems (Bandura, 1977b, 1986).

1.3.2 Self-Efficacy and Health Behaviour

In the social-learning theory of causation, behaviour, cognitive and physiological factors, and environmental influences all operate as interacting determinants of each other.

Self-Efficacy theory proposes that people's perceptions of their capability affect how they behave, their level of motivation, their thought patterns and their emotional reactions in challenging situations. Self-Efficacy theory provides one common mechanism through which people exercise influence over their own motivation and bchaviour. With this in mind, Self-Efficacy theory has been widely applied to the study of health behaviour. An individual's judgement of their self-efficacy impacts upon choice behaviour, in that it determines which activities will be attempted and which will be avoided. Such self-judgements have been seen to have an affect on individuals' attempts to increase physical exercise following myocardial infarction and more generally, by reducing their alcohol, cigarette and drug use, or their food intake and by practising relaxation. Self-efficacy also reflects in how much effort a person is prepared to put in to achieving a goal and the degree of persistence when they are faced with difficulties. Given this it may be the case that patients, who must

conform and adhere to complex medical regimens, may be more successful in managing their illness and complying for longer periods of time, if they hold beliefs that their abilities to affect their health are strong. This may be suggestive of holding an internal locus of control. Anxiety may also be reduced in individuals undergoing aversive medical procedures that demonstrate high levels of coping-efficacy. More generally, a reduction of anxiety in areas of life may prevent long-term chronic levels of stress.

At this point it is relevant to make clear the distinction between an individual's judgement of self-efficacy and outcome expectations. Perceived self-efficacy refers to people's judgements of their sense of competence to carry out given levels of performance. Outcome expectations, on the other hand, are judgements about the results the behaviour will produce (Bandura, 1977a).

Health behaviours vary in their complexity, as do the degree and nature of skill required to produce a more favourable outcome. An individual's perception of self-efficacy becomes increasingly more important in determining the outcome when a greater degree of skill is required to execute the behaviour.

Self-efficacy is measured in terms of three parameters: level, strength and generality. Level of self-efficacy refers to the person's expected performance attainments. Self-efficacy strength expresses the confidence people have that they can attain each expected level. Generality refers to the number of domains of functioning in which people judge themselves to be efficacious. In measuring perceived self-efficacy, people are presented lists of tasks, usually graded in difficulty, and they are asked to

judge those they believe they can perform. For each task so designated, they rate the strength of their perceived efficacy on a 100 point scale ranging from high uncertainty, through intermediate values of certainty to complete certainty.

Self-efficacy beliefs often involve technical skills required to successfully carry out the required behaviour. For example, significant levels of skill might be required for monitoring pulmonary function in asthma and administering medications correctly. Skills for effective interaction with others are often necessary, often as a means to deal and cope with peer pressure. Given the above information, it is easy to see why one might consider that an individual's level of anxiety, health locus of control and attitudes toward illness might play a role in determining self-efficacy.

A range of outcome expectancies is also likely to be of relevance for health-related behaviour. Physical health outcomes are often, although not all the time, strong determinants of health behaviour. Expected costs arising from implementing such behaviours are also likely to play a role. Social outcomes, including approval from others must also be considered to play a role, as are the individuals' own self-evaluative processes. It follows from this argument that individuals who believe themselves to be capable of managing or controlling a stressor that reduces the impact or prevents damage to them will be less anxious individuals (O'Leary, 1992). This would suggest that those individuals who have a higher internal health locus of control would have lower levels of anxiety. This suggestion will be tested as means of a secondary hypothesis in the current study.

From the literature reviewed, self-efficacy has been shown to affect the adoption of a variety of health-related behaviours, as suggested by Bandura (1986) and O'Leary (1985). This includes asthma. Successful models of childhood asthma intervention have been based on Bandura's Social Cognitive Theory and will be reviewed below.

1.3.3 Self-Efficacy in Children

A study by Schlosser & Havermans (1992) has suggested that children's sense of self-efficacy, defined as "the conviction that one can successfully execute behaviours required to produce outcomes", plays an important role in children's ability to cope with asthma attacks. Clark, Rosenstock, Hassan, Evans, Wasilewski, Feldman & Mellins (1988) have reported that self-efficacy is an important predictor of self-management behaviour among children. Tobin, Wigal, Winder, Holroyd & Creer (1987) suggest that self-efficacy plays a central role because it influences whether or not knowledge of illness management is effectively employed to prevent or manage asthma attacks.

Schlosser and Havermans (1992) examined self-efficacy in childhood asthma. As knowledge has been described as an important determining factor in self-efficacy expectations, it was hypothesised that higher self-efficacy scores would be associated with children who were well informed in facts about asthma and treatment. Also, it is given that perceptions of self-efficacy influence behaviour as well as emotional actions. From the social learning point of view, the perceived in-efficacy in coping with aversive events makes an individual anxious. Thus, Schlosser and Havermans (1992) hypothesised that lower self-efficacy scores would be found in children who

reported more anxiety. Results of this study did indeed confirm the conceptual relationships between asthma self-efficacy, knowledge and anxiety.

A more recent study by Miles, Sawyer & Kennedy in 1995 has attempted to identify factors that influence children's sense of competence to manage their asthma. Sixty-two 8-16 year old children and adolescents who had been admitted to hospital for asthma management rated their sense of competence to manage their asthma, motivation to achieve healthy functioning, and sense of control over their health. Parental knowledge of childhood asthma management was also measured. The results of this investigation suggested that older children, children who were more intrinsically motivated to achieve healthy functioning, and children whose parents are more knowledgeable about asthma management feel more competent to manage their asthma.

1.3.4 Summary

In his theory, Bandura made the important observation that expectations about the outcome of a behaviour are not sufficient to promote that behaviour; people, including children, must also believe that they are effective at performing the behaviour. Individuals will not typically execute a behaviour that might produce a positive outcome if they do not expect that there is a good chance of their succeeding in the actions required for the behaviour, in other words, their being efficacious. The variable of self-efficacy underlies many of our behaviours, including those performed by asthmatic children to control their condition.

The current study investigated psychological factors that may influence children's beliefs regarding their abilities to perform self-management skills and hence their asthma self-efficacy. The following sections will both describe and discuss the relevance of the psychological variables that are to be examined. These include children's health locus of control, children's attitudes toward illness and anxiety. Further to this, sections regarding the importance of asthma knowledge and parental factors are given consideration.

1.4 Children's Health Locus of Control

1.4.1 The Concept of Locus of Control

Rotter was first to devise the concept of locus of control in 1954 and then 1966. Rotter's social learning theory describes how the likelihood of an individual engaging in a particular behaviour is dependent on the interaction between reinforcement of the behaviour and how much this reinforcement is valued by the individual. Locus of control theory describes the beliefs held by individuals regarding outcomes and operates at general as well as specific levels. Rotter's theory made the distinction between internal and external locus of control beliefs. People with an internal locus of control believe that events or outcomes are more dependent on their own actions, whereas an external locus of control assumes that events or outcomes, are less influenced by personal action and more by forces such as luck and powerful others.

Lazarus & Folkman's theory (1984) stated that an individual's beliefs regarding their personal control of outcomes, and in particular threat, plays a key role in how they interpret and evaluate the threat. Empirical examination of Rotter's construct have

indicated that people with an internal locus, in comparison to those with external locus of control beliefs, are more likely to attempt to assert control over their environment and take responsibility for their own actions. They are also more likely to seek out and assimilate pertinent information, demonstrate effective learning, and exhibit autonomous decision-making (Phares, 1976; Strickland, 1978). External subjects have also been found to have problems in adapting to major life events (Kinmann, Laval & Wanlass, 1978) and to display greater levels of psychological symptomatology (Kno, Gray & Lin, 1979). Thus, on a broad-spectrum those individuals who score higher in internal locus of control scales are those who are more likely to describe less psychological and physical symptomatology (Joe, 1971).

1.4.2 Critical Analysis of Locus of Control

It is of note that Rotter chose locus of control as his first and major generalised expectancy construct. A generalised expectancy is something the person carries from one situation to the next; it is more trait-like than state-like and thus is similar to a personality dimension. Given Rotter's proposal that expectancies linked actions to outcomes, he could just as easily have developed some other cognitive expectancy construct such as self-efficacy, mastery or perceived competence.

Two further points have been made about the concept of locus of control when it has been linked to assessing health behaviour. The first of these is that the validity of the available devised scales was low. Following on from this point, Rotter (1975) had posed that for individuals who had prior experience in a given situation that situation specific beliefs could be utilised and thus situation specific measures seemed appropriate and reasonable. The second point often made concerned the

unidimensional scoring of the locus of control scales into internal and external aspects (Collins, 1974; Levenson, 1974), whereby it was argued that the external dimension could be further subdivided into control by chance/luck as well as powerful others (Levenson, 1974).

In response to the above points the Multidimensional Health Locus of Control Scale (MHLC) was developed (Wallston, Wallston & DeVillis, 1978). This measure currently remains to be widely used in the prediction of health behaviours (Wallston, 1992).

1.4.3 Health Locus of Control

The likelihood of individuals engaging in health related behaviours have been the focus of study for health psychologists for many years. To a large extent, much of this research has studied the contribution that an individual's beliefs about health make to their behaviour (Wallston, 1992). To this end, it is not surprising that cognitions concerning an individual's control over their health, and especially the locus (place) of this control have attracted the most interest in researchers (Wallston, 1989; Wallston, Wallston, Smith & Dobbins, 1987).

Following the point made by Rotter in 1975, that an individual's situational specific beliefs were more likely to predict their behaviour in specific situations, Wallston, Wallston, Kaplan & Maides (1976) developed the Health Locus of Control Scale. It was intended that this scale would be used to increase the predictability of locus of control when applied to an individual's behaviour in health situations.

The application of social learning theory to the study of health behaviours takes the perspective that the potential for a person to carry out certain health related behaviours is a multiplicative function. This includes the belief held by the person that their actions would actually affect their health outcomes and the degree to which the person values their health. The health value concept is considered a moderating variable between health control beliefs and the execution of health related behaviours by an individual (Wallston, 1992). To put it another way, if a person actually places value in a particular outcome or result, and believes their actions can influence this then they will undertake the health related behaviour to accomplish this goal.

Compared with the previous general nonspecific Locus of Control Scale, the original unidimensional scoring of the Health Locus of Control Scale (internal versus external) was found to be a better predictor of the behaviour of people within the healthcare environment (Wallston, Wallston, Kaplan & Maides, 1976). At a later stage this scale was further modified to the Multidimensional Health Locus of Control Scale, based on the finding that the external scale consisted of two dimensions, those of powerful others and chance (Wallston, 1989).

1.4.4 Children and Locus of Control

Although there has been a lot of interest in studying and investigating the control beliefs of adults, the same cannot be said for children (Norwicki & Strickland, 1973). Studies that have been conducted to date have illustrated that the direction of locus of control can be used to determine coping in children of school age (LaMontagne, 1987). Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld & York (1966)

noted that in relation to achievement at school, belief in destiny has been identified as a significant predictor of mood.

On the whole however, earlier attempts at measuring children's locus of control beliefs had not been wholly successful, as reviewed by Norwicki & Strickland (1973). This led to the development of the Norwicki-Strickland Locus of Control Scale for Children (1973). This scale has been used widely to measure children's generalised health control beliefs.

Following the views raised by Rotter (1975) and Wallston, Wallston, Kaplan & Maides (1976), there has been a move to devise specific scales to measure health locus of control, but particularly to develop specific scales for specific categories of behaviour. Based on the rationale used by social learning theory to explain health behaviour,. Parcel & Meyer (1978) developed their Children's Health Locus of Control Scale. The development of this scale was further justified following the growing importance to generate specific health locus of control scales and given the benefits of results from use of the adult health locus of control scales (Wallston, Wallston, Kaplan & Maides, 1976).

1.4.5 Childhood Chronic Illness and Health Locus of Control

Several multifactorial models of health behaviour have been developed in an attempt to offset the traditional deficit centred approaches to chronic childhood illness. As such, these models highlight features of health behaviour which include children's perceptions of their knowledge about their condition, their beliefs and attitudes toward illness and their vulnerability (Perrin & Shapiro, 1985). In this way, the

importance of health control beliefs becomes clear, especially with regard to how effectively children with chronic illness understand, consent to and conform to their medical care. The current study investigated the above factors in relation to childhood asthma self-efficacy and hence self-management.

Perrin & Shapiro (1985) investigated the health beliefs of children with various paediatric conditions and compared these with normal samples. The results indicated that child's health beliefs show significant change around the ages of 7, 9 and 13 years, which supported the widely held view that different conditions affect children differently and their impact is unique to the individual's experiences.

Work on developmental aspects of children' understanding of health has focused on Piaget's theory (1929). It is suggested that the child's concept of illness progress through a series of developmental stages to correspond with the pre-conceptual, concrete and formal operational stages of cognitive development (Biba ce & Walsh, 1981).

Perrin & Shapiro (1985) demonstrated that children who had asthma or diabetes did not hold differing health locus of control beliefs from the normal population. However children suffering from a seizure disorder or an orthopaedic condition did show signs of less internal beliefs about their health. Nevertheless these results should be interpreted with an element of caution as the differences found may be due to the different nature of the conditions investigated. It is true that asthma and diabetes are both severe and distressing chronic conditions, however it does appear that children have slightly more control over the disease process in these conditions

than the arguably more unpredictable and uncontrollable conditions such as seizure disorders and orthopaedic problems. In their conclusions, Perrin & Shapiro (1985) stated that considerably more research was required to investigate how health locus of control beliefs is affected by, and affect, different paediatric conditions.

1.4.6 Asthma self-efficacy and health locus of control

Creer (1987) noted that the successful performance of self-management skills to manage asthma, and hence the development of self-efficacy results in a change in the locus of control patients perceive regarding their asthma. As it has been stated, perceived (health) locus of control has two dimensions, namely internal and external. Significant changes in locus of control so patients come to believe themselves capable of managing aspects of their asthma has been reported as a consequence of performing self-management skills to control their asthma.

1.4.7 Summary

Health beliefs have a major impact on a patient's ability to cope with asthma. If they feel that health professionals are responsible for their health, then they are likely to require a lot of help and support before they would be able to self-manage their condition. On the other hand, individuals who feel they have sole responsibility for their health may delay in getting medical help, continuing to self-manage with potentially detrimental and serious results (Booker, 1996).

The theory of locus of control was developed by Rotter (1966) who suggested that there were individual differences in the extent to which people saw control of

reinforcement as being under their own control or due to external forces, and hence the internal-external dimension unfolded.

Under the health belief model, two factors are said to principally impact upon behaviour. First the value that an individual places on a particular goal must be considered. Second the individual's estimate of the likelihood that any particular action will result in that goal. Therefore, those individuals that have a high internal health locus of control are more likely to see their own actions and behaviour as resulting in health gains and thus, as a result, become more likely to modify their behaviour.

However, Wallston (1992) noted that neither he nor Rotter appreciated that the construct of locus of control plays a far less significant role in predicting health-directed behaviour than does either health value by itself or other control-related expectancy constructs, such as self-efficacy (Bandura, 1977b, 1982), mastery (Pearlin & Schooler, 1978) or perceived competence (Smith, Dobbins & Wallston, 1991).

In order to predict specific behaviours, such as asthma self-management, Wallston (1992) noted that one needs to supplement one's set of predictors with more behaviourally specific expectancies such as self-efficacy beliefs (Bandura, 1977b, 1982) or other specific behavioural expectancies, including attitudes toward illness (Ajzen & Fishbein, 1980).

Wallston (1992) noted, "that an internal health locus of control orientation is a necessary, but not a sufficient, condition for engaging in proper health behaviour". One must believe, to at least some degree, that one's health status is dependent upon one's health behaviour in order for a person to act. This is of course assuming that the person is motivated to do so by valuing the reinforcement that good health would bring them. Nevertheless it is important to remember that just because a person values health and feels responsible for their health does not mean that the person feels capable of taking the right steps to control and achieve healthy functioning.

The current research intended to establish if children's health locus of control has any relationship with children's self-efficacy, as the results that are available this far are conflicting.

1.5 Children's Attitude Toward Illness

One of the main approaches in paediatric psychology is to view the chronic illness as a stressor for the family and use family stress theory to frame the research (Roberts & Wallender, 1992). Within family stress theory, a major concept proposed to influence coping and adaptation to chronic illness is the meaning that the illness holds for the family members (Patterson, 1988).

Based on the Double ABCX model (McCubbin & Patterson, 1983) and findings on chronic childhood illness (Lefebrve, 1983), how children feel about having a chronic illness is believed to play a significant role in how they cope with and ultimately adapt to the chronic condition. Studies have illustrated that children who view their illness as making them different or less worthy than their peers are believed to

withdraw and become more socially isolated (Lefebvre, 1983). Murphy (1974) found that children who were able to put emphasis on the positive aspects of their condition had a more favourable recovery from illness. Children who have negative feelings about having the chronic condition are more likely to engage in maladaptive coping behaviours and, as a result, have a more negative adaptation to the condition than children who have positive feelings about having a chronic illness (Austin, Patterson & Huberty, 1991).

The Double ABCX model (McCubbin & Patterson, 1983) posits that the factors that predict positive adaptation to a chronic stressor, such as a chronic illness in a child, are decreased demands on the family, increased family adaptive resources, positive family definition of the stressor (attitudes), and adaptive coping behaviours. As a consequence, it was anticipated in the current study that there would be a positive relationship between children's attitudes toward their asthmatic condition and their level of self-efficacy. Hence low self-efficacy would be associated with more negative attitudes about the condition because of the likelihood of disruptions and limitations in the child's life and, therefore high self-efficacy positively related to positive attitudes towards their asthmatic condition.

It is a common view that " children with diseases such as asthma should take responsibility for their own medication as soon as possible" (Bevis & Taylor, 1990). Pearson (1991) noted that children around the age of eight years of age are able to significantly contribute to their own management. The child remembering to take their preventer medication on a daily basis and carrying their reliever inhaler with them could achieve this.

There is a lot of information about adults' views of having asthma and managing it. The value of producing the same information from a child's point of view has received mixed feelings in the research field; Hyland (1991) questioned both the feasibility and usefulness of such an exercise, whilst Jones (1991) was very much advocating the investigation of children's views into having and managing asthma, believing that children can make a positive contribution to their management.

However for the purposes of this study, it was felt important to appreciate how children view their illness in relation to how they then manage it. Gillespie (1990) has stated that by understanding how children both understand and view their illness that clinicians may be more readily able to "more fully and successfully treat the whole patient...win compliance...do more than alleviate symptoms...change the course of the disease itself". Thus it is clear that with the increasing number of children with asthma that not only is a review of management and feedback from the parents required but it is equally important for clinicians to listen to the child. Christie, French, Sowden & West (1993) support this view. Living with asthma as perceived by the child may not be the same as the parent figure's perception, nor the child's teachers or their health care professionals. Eiser & Havermans (1994) have illustrated the importance of understanding children's attitudes to asthma and its management with regard to optimising their quality of life.

1.6 Anxiety

1.6.1 Asthma and Anxiety

Staudenmayer (1982) attempted to determine whether the debilitation that asthmatic children experience is an antecedent or a consequence of associated anxiety. The

findings supported the conclusion that certain types of anxiety in most children with asthma are consequences of poor manageability, rather than antecedent conditions that undermine medical management. However, Staudenmayer concluded that other forms of anxiety might exacerbate asthma once an attack has begun.

The current study investigated the relationship between anxiety (all encompassing anxiety) and the abilities and beliefs of children to manage their asthmatic condition.

1.6.2 Findings from previous studies investigating asthma and related anxiety

Vila, Noilet-Clemencon, de Bilc, Mauren-Simeoni & Scheinmann (2000), studied a series of eighty-two 8-15 year old children and adolescents with moderate and severe persistent asthma to establish the prevalence of DSM IV anxiety and affective disorders in a paediatric population of asthmatic children and adolescents. These children were compared to those of matched healthy controls. Results indicated that there were more anxiety symptoms in the asthmatic group than in the control group, with generalised anxiety disorder being the main diagnosis. Asthmatics were not however significantly more depressed than controls and their self-esteem was as good.

Carr (1999) reviewed the literature on the relationship between panic and anxiety whilst considering the experience and management of asthma and found that the co-occurrence of panic disorder and asthma is greater than would be expected based on their individual prevalence rates. He noted that asthma, partly due to respiratory factors, is a risk factor for developing panic disorder, whilst recognising that panic and anxiety symptoms affect the course of asthma. Panic and anxiety may increase

and make worse asthmatic symptoms through hyperventilation. Anxiety is also further associated with frequent and longer hospital admissions, and overuse of reliever medication.

Bussing & Burket (1993) compared 37 asthmatic children, 23 children with haemophilia, and 31 healthy children and found that the prevalence of anxiety disorders was significantly higher in the group with asthma than in the healthy control group. Again the current study investigated the influence of anxiety on asthma self-efficacy.

In an earlier study by Kaptein (1982), it was hypothesised that patients who are highly anxious and/or feel stigmatised by having asthma are the individuals who are least likely to be able to manage and adapt to their condition. Following on from this, the current study hypothesised that children with higher levels of anxiety will have lower self-efficacy with regard to their sense of competence to manage their asthma.

1.6.3 Self-Efficacy Conception of Fear Arousal

As stated earlier, perceptions of self-efficacy affect emotional reactions as well as behaviour. This is especially true of anxiety and stress responses to unfamiliar or potentially aversive events. Self-efficacy theory suggests an alternative way of looking at human anxiety.

From the social learning point of view, it is mainly perceived inefficacy in coping with situations that may be potentially unpleasant and distressing that makes them fearsome. But the fact that an individual can prevent, put an end to, or at very least

reduce the associated unpleasantness of such a situation or event, suggests there is very little reason to fear them. Thus, successful experiences that increase the coping efficacy of an individual will reduce their fear arousal and increase the likelihood that they will interact again with, and appropriately manage the previously feared stimuli. An example in working would be a child who previously feared participating in sport in case of triggering an asthma attack. If the child, supported and educated about asthma management, can then take part in sport and either manages to prevent an attack, or successfully intervenes when he detects an impending attack, and thus has a successful outcome due to his own efforts, he is much more likely to again participate in sport.

1.6.4 Cognitive Development and Asthma Anxiety

As children mature it is assumed that cognitive development follows suit, enabling the older child to develop a deeper and more thorough understanding of their disease or condition. Yet with such knowledge goes an insight into the potential complications and limitations of treatments and an awareness of personal vulnerability. Thus greater knowledge can be accompanied by greater anxiety (Allan, Affleck, Tennan, McGrade & Ratzam, 1984). It is noted that while adolescents may develop the cognitive capacity to understand disease, they are often less well prepared to handle the emotional consequences (Eiser, 1993).

1.6.5 Summary

The role of anxiety in childhood asthma, as an antecedent or consequence of the debilitation seen in children suffering from the condition is discussed. It is noted that more anxiety symptoms are present in a group of asthmatic children compared to a

control group. This finding is further confirmed by evidence presented that the co-occurrence of panic disorder and asthma is greater than would be expected from their individual prevalence rates. Hence, it is suggested that highly anxious individuals with asthma are less likely to be able to manage and adapt to their condition well. Given that perceptions of self-efficacy affect emotional reactions as well as behaviour, it is implied that positive experiences that increase the coping efficacy of an individual will reduce their fear arousal. Hence, increasing the likelihood that they will manage what was previously feared. A final note is made about the effects of cognitive development and the potential for deeper understanding, although perhaps leading also to increased anxiety.

1.7 Children's Knowledge about Illness

Although knowledge about one's illness seems crucial for effective self-management, it has been noted that providing patients with knowledge on its own is not enough to change their behaviour (Hilton, Ross Anderson & Sibbald, 1986).

Rubin et al. (1989) investigated the relationship between asthma management behaviours and knowledge about asthma, behavioural adjustment, anxiety, and health locus of control in ninety-one children aged 7 –22 years. All members of the sample were categorised as having moderately severe asthma. Asthma management behaviours were found only to be significantly related to level of asthma knowledge. This relationship was however non-linear, thus accurate knowledge is related to engaging in more of the appropriate and recommended asthma management behaviours but only up to a moderate level of knowledge. This relationship was stronger for children who scored lower on levels of behavioural adjustment. The

study also noted that children of higher socio-economic status were more likely to conform to recommended procedures.

In a study by Eiser et al (1989), forty-nine children between the ages of 7-16 years were examined on their understanding of asthma. The results showed that more than half of the children investigated could not offer any possible reasons for the causes of asthma. For those who did offer suggestions, the most common reason given was hereditary factors, followed by allergies and then various physiological explanations, including 'lungs not working properly'. There were no reported age differences for the explanations that children gave. Interestingly, most of the children sampled believed that they would outgrow asthma, with only 16 per cent of the sample expecting to have the condition for the rest of their lives. Again no age differences were reflected in children's beliefs about outgrowing asthma. This study highlights how potentially little information children may know about their conditions and suggests that this may be the route of continued symptomatology for some children. This standpoint is the basis on which the educative element in self-management programs rests on.

However, as Rubin et al (1989) and others have illustrated, the mediating role of asthma knowledge in self-management is not entirely clear. This study attempted to establish the nature of the relationship between children's sense of competence to manage their asthma and the level of knowledge that they have about their condition.

It has been suggested that children's understanding of asthma, its prevention and management develops over time (Burbach & Peterson, 1986), so it might be

expected that self-efficacy improves with age. The current study examined the relationship between self-efficacy and age.

1.8 Parental Attitudes and Knowledge about Illness

1.8.1 Parental Asthma Knowledge

Children's medical experiences have been shown to negatively effect their families, creating anxiety and testing the limits of parent and sibling coping skills (Genevro, Andreassen & Bornstein, 1996). There is little knowledge concerning how parental knowledge may influence a child's knowledge level. Though a study by Parcel et al. (1980) found a positive relationship between mother's and child scores on a test of asthma knowledge (correlation coefficient of .31, $p < .01$). However, it must be noted that not all parents are highly motivated when it comes to learning about how to manage their child's asthma.

McElreath & Roberts (1992) assessed perceptions of AIDS related knowledge and tolerant attitudes in both adults and children, and found that parental knowledge statistically predicted children's attitude, but not the knowledge of the child.

It has been suggested that parental knowledge may be related to adjustment in the child in that parents will provide appropriate guidance and support for their child, as well as contributing to their education about their condition (Bradford, 1997).

1.8.2 Parental Attitudes

Children's participation in self-management behaviours may be impeded by negative attitudes held by others in the community. Children may then adopt these attitudes

themselves, which may make them less likely to identify themselves as being asthmatic and thus not seek appropriate medical assistance in times of need. Donnelly, Donnelly & Thong (1987) in an Australian study found that the parents generally held negative stereotypical views of asthmatic children. This was particularly true for parents whose children were not asthmatic. They held beliefs that children with asthma were more dependent and used their asthma to get attention. Further to this it was found that parents of asthmatic children held negative attitudes towards drug treatments. Given that the first line of treatment for children with asthma is the use of bronchodilators, this attitude surely runs conversely to effective management. Finally the study illustrated parents' reluctance to modify their behaviour in relation to their child's asthma, although more willing to give up pets, they were much more unlikely to give up smoking.

1.8.3 Importance of Family Involvement

The term "self" used when referring to self-management may lead to the misperception that this means 'self-treatment', with no assistance/input from physicians/doctors. In actual fact though well-designed asthma education programs ought to improve the effectiveness of the interactions between patient and physician. From the physicians' viewpoint, such educational programs offer the potential to make patients more effective partners in the management of chronic disease. Because asthma is a complex illness, and often unpredictable, it is impossible for doctors to cover every contingency with their patients. Therefore, individuals with asthma are responsible for a lot of independent decision-making about their condition. Where it is a child that has asthma, then it is often the case that, parents and other family members make the important decisions such as getting medical assistance, taking

medications, controlling the physical and emotional environment as appropriate. For these reasons it is essential that patients and their families are involved and understand their role in managing the child's asthma.

Such educational programs for patients with asthma offer them and their families the opportunity to increase their understanding and help them manage the condition more effectively by participating as active partners with their physician in controlling the disease.

1.8.4 Summary

In the past twenty years many programs have been developed to teach self-management practices to school-aged children with asthma and their families. These programs use basic principles of education and behaviour modification and teach the important skills that patients and families must have to participate actively and effectively in their care. All programs to one extent or another cover the following issues: recognising signs and symptoms of asthma; giving and taking asthma medications correctly and coping with any side effects; staying calm and preventing panic; being aware and acting upon symptoms that require emergency treatment; limiting exposure to asthma triggers; enabling the child to live a normal as possible life with regard to physical and social activities and communicating effectively with health care personnel.

Given the above it seems important to assess the importance of parents' sense of competence or self-efficacy to manage their child's asthma, with regard to the impact this may have on children's asthma self-efficacy.

The current study investigated the impact of parental knowledge on children's knowledge, but more specifically asthma self-efficacy, hypothesising that a positive relationship would be found.

1.9 Rationale, Aims and Hypotheses

1.9.1 Rationale

The importance of the self-management health beliefs and behaviours of chronically ill children has been clearly identified in the literature. Self-management programs have a number of advantages over treatment programs in which children are more passive recipients of advice from parents or medical personnel. Self-management programs encourage children with asthma to be more independent and less reliant on health services. They also encourage children to develop skills to deal with urgent or unforeseen problems and to achieve greater independence in managing their illness.

Self-management programs have increasingly drawn attention to the important role that children can play in the management of their illnesses. However, if self-management programs are to effectively help children with asthma it is necessary to more clearly identify psychological factors that influence children's abilities to appropriately employ self-management techniques. A key factor in this area is children's sense of their competence or efficacy to manage their asthma.

The current study primarily aimed to replicate and further extend earlier work (Rubin et al., 1989; Miles et al., 1995) by investigating several characteristics of children's cognitive functioning, namely health locus of control, attitudes toward illness and

reported levels of anxiety that may influence asthma management self-efficacy. In addition to this, the relationship between child and parental knowledge of asthma and parent asthma self-efficacy was examined in relation to children's asthma self-efficacy.

In summary, childhood asthma is a major public health issue, which affects up to one in every seven children. This condition causes considerable distress to both children and their families and has a major impact on the resources of paediatric facilities. Self-management programs have the potential to offer an important means of helping children and their families both deal with and manage their asthma. In order for these programs to be fully effective however, it is important that clinicians have an understanding of the psychological factors that influence children's sense of competence to manage asthma. This study intends to go some way in doing so.

The main objective is to identify psychological factors that may influence asthma self-efficacy, and to gain an understanding of the interaction between these factors. It is predicted that an increased understanding will inform treatment approaches, specifically relating to self-efficacy, for children and parents who are having difficulty with asthma management.

1.9.2 Aims

The aims of the current study are:

1. To identify psychological variables that might influence children's asthma self-efficacy such as health locus of control, attitudes toward illness and anxiety.
2. To explore the relationship between children's level of asthma knowledge and their sense of competence to manage the illness.

3. To assess the relative importance of contributions of parental factors, including parents' level of asthma knowledge and parent asthma self-efficacy to children's asthma self-efficacy.

1.9.3 Hypotheses

Specific hypotheses to be tested out include:

i. Children who believe that their health is influenced by factors within their control will report that they feel more competent to manage their asthma when compared with children who believe that their health is determined by factors outwith their control.

ii. Children who hold positive attitudes towards their illness will report a greater sense of asthma self-efficacy than children who hold less positive attitudes.

iii. Children who report low levels of anxiety will report higher asthma self-efficacy than children with high anxiety.

iv. Children, whose parents have a greater knowledge of asthma and high asthma self-efficacy, will report higher asthma self-efficacy than children whose parents have less knowledge of asthma and low parent asthma self-efficacy.

v. Children who have more knowledge about their asthma will report higher levels of asthma self-efficacy than children will with low levels of knowledge about their condition.

vi. Parent and child asthma self-efficacy are hypothesised to be positively related to one another.

2. METHOD

2.1 Ethical Approval

Both the Grampian Research Ethics Committee and Educational Services in Moray granted ethical approval for the study subject to minor amendments.

2.2 Design

The study adopted a within group, cross-sectional approach to investigate the relationship between psychological factors and asthma self-efficacy in children with asthma and their parents. Factors that may influence children's asthma self-efficacy including anxiety, health locus of control and attitudes toward illness were examined. Children and parents' knowledge of asthma and parent asthma self-efficacy were also measured to assess their importance in determining children's asthma self-efficacy. A correlational design was employed to test for associations and relationships between children's asthma self-efficacy and the psychological factors considered above.

2.3 Participants

Children, aged 7-15 years, and their parents were recruited via one of three routes. Initially only parents and children attending the Asthma Out-patient Clinic based at Dr. Gray's Hospital, Elgin, and run by a Consultant Paediatrician and Asthma Specialist Nurse, were approached regarding participating in the present study. This is the main outpatient facility for children with asthmatic conditions within the Moray region. It was however considered important for the study to both increase the sample size and include a wider community sample of asthmatic children who were not attending a hospital clinic, perhaps not requiring specialist input for their

asthmatic condition. To this end a number of local primary and secondary schools were approached to participate in the project.

It may have been more efficient and effective to further recruit subjects by contacting GP practices, however the researcher was aware that ongoing asthma medication trials were taking place. This would have meant excluding large amounts of potential participants given that the local ethics committee will not allow subjects to be involved in more than one research project in any six-month period.

2.3.1 Inclusion criteria

Children aged 7-15 years of age who had been diagnosed with asthma and prescribed daily medication to control their condition were included in the study. This age group were deemed appropriate for the measures selected for use. Parents were asked to rate their perception of the severity of their child's asthma as mild, moderate or severe.

Initially the current study intended to make use of the Pearlman and Bierman classification system (Pearlman & Bierman, 1988) in order to rate a child's asthma severity level. This worked well for the subjects who attended the asthma clinic, as their medical records could be easily reviewed, however time limitations deemed it impractical to contact GPs for severity rating for the rest of the sample.

Due to the uncertainty of classifying severity of illness, and the difficulties with determining what categorises as short or long duration of illness, it was decided not

to include these factors in the main hypotheses of the current study. Information would be collected on the duration of illness however for demographic purposes.

2.3.2 Exclusion criteria

Children who had been diagnosed with asthma for less than six months were not included in the study as the researcher felt that these children might have less stable responses than children who had had asthma for a longer period of time and were more likely to have adjusted to their condition.

Any children who had significant learning difficulties were excluded from the study. Parents were asked if they were aware of any specific or general learning difficulties that their child had prior to the testing session. Children were not specifically tested for learning difficulties although the initial questions in the asthma knowledge questionnaire were used to ensure comprehension. This decision was made based on the essential requirement that children must be able to understand the instructions given to them for the self-report measures. Several of the self-report measures gave practice items that allowed the researcher to continue to monitor and ensure each child's level of understanding was sufficient.

Further to this, any children or their parents who were currently taking part, or who had taken part in the last six months, in any other study were excluded.

2.4 Procedure

Participants were introduced to the research project by one of three routes. Firstly, when attending the outpatient clinic, patients were invited to participate in the study

by either the author or the Asthma Specialist Nurse. Secondly, patients who were not due to attend the clinic within the timescale of the study were contacted via letter. Of fifty-two letters sent, twenty-two responses were received. Thirdly, participants were recruited, with permission from Head Teachers, via local primary and secondary schools. Fifteen Head Teachers were contacted and nine gave permission to access their pupils. The recruitment from schools ranged from 8-43 per cent. All participants (parents and children) were given Information Sheets detailing the rationale and nature of the study (Appendices 1 & 2). Parental consent was required for the children to participate in the study. A total of 80 respondents expressed an interest. Of these, 78 met inclusion criteria. Two were excluded on the basis that one child had moderate learning difficulties and the other was already involved in another research study. Two respondents, when contacted, decided not to participate due to other commitments. A further five agreed appointment times but then did not attend. Thus 71 of the 80 respondents participated in the research project.

Participants attended a clinic at Dr. Gray's Hospital, Elgin, where they completed the measures. Where transport difficulties or long distance did not permit attendance at the clinic, the author travelled to the participant's home. Each clinic session or home visit followed the following format. A general introduction to the study where children and parents were encouraged to ask questions or raise any other concerns they may have had about their participation. Written consent was always obtained from the parent (Appendix 3) before continuing. If the researcher deemed the child competent enough to understand the contents of the consent form then they were also asked to give their signature. All children themselves were asked for verbal consent to participate in the study. The option to stop at any time was explained to the child

and the parent. Time was specifically spent with the child to put them at ease in the room; this was usually done through chatting about the activities that the children engaged in after school or during their school holidays. These were also the time periods that the majority of the testing took place in order to reduce the time that children needed to be absent from school. The child and parent were also informed that individual responses would remain anonymous and would not be offered to any other persons. This was done in an attempt to reduce the possibility of a child overly reporting positive behaviours. The parents were asked to complete their part of the assessment (2 questionnaires) whilst their child worked with the researcher (Appendices 4 & 5).

The researcher administered the battery of children's measures with the child in isolation from the parents. This was done because observations from clinical practice had indicated that administering self-report measures to children while their parents are present could be problematic, as parents may interrupt to 'correct' responses they feel their child has answered 'incorrectly' or differently from the way in which they thought their child would or perhaps, should have answered. Thus parents were asked to complete their part of the assessment in another room. However if children did not feel completely comfortable or if parents were clearly keen to remain with their child, then this was not discouraged. This in fact only occurred on two occasions. Parents of each child completed two questionnaires as well as several additional questions that covered background details, whilst children completed five questionnaires.

The children's measures were always presented in the following order:

1. Asthma Knowledge Questionnaire (Parcel, Nader & Tiernan 1980) (Appendix 6)
2. Child Asthma Self-Efficacy Measure (Bursch, Schwankovsky, Gilbert & Zeiger, 1999) (Appendix 7)
3. Children's Health Locus of Control Scale (Parcel & Meyer, 1978) (Appendix 8)
4. Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1994) (Appendix 9)
5. Child's Attitude to Illness Scale (Austin & Huberty, 1993) (Appendix 10)

The Asthma Knowledge Questionnaire was presented first to allow a baseline of knowledge to be established before further asthma management behaviours were discussed. Also the easy true/false format of the measure further made the child feel at ease and facilitated engagement, whilst allowing the researcher to gauge children's comprehension level.

Children were seen for an average of 30 minutes, though this varied from 20 to 45 minutes and often depended on the level of assistance each child required. All children were offered complete support and indeed some children preferred to have the whole battery of measures read to them.

Following completion of the assessment, parents and children were given a final opportunity to ask any questions or raise any concerns that they had. Parents and children were informed both of the time-scale for completion of the study and invited

to attend a public presentation of the findings. The results were also to be made available at various places in Dr. Gray's Hospital, Elgin. Some parents had raised queries and issues about the medical management of their child's asthma and were, in these instances, directed to their GP or the Asthma Specialist Nurse.

2.5 Measures

2.5.1 Child's Knowledge of Asthma

Children's knowledge of asthma was assessed using the 20-item children's version of the Parcel Knowledge of Asthma Questionnaire (Parcel et al., 1980). This measure tests for knowledge of basic concepts about the nature of asthma and general management procedures and includes items about the origins of asthma attacks, the reasons for taking medications and their effect on preventing and managing asthma attacks. Children are required to answer each question as true or false. Each correct answer is awarded one point, resulting in a potential score anywhere in the region of zero to twenty. The higher the score is the greater the asthma knowledge. The Kuder-Richardson coefficient of internal consistency (a measure of reliability) for the child scale was 0.56.

2.5.2 Child Attitude to Illness Scale

This measure is a short self-report questionnaire designed to provide an assessment of how favourably or unfavourably children feel about having a chronic condition (Austin & Huberty, 1993). The measure was designed using comparisons between children suffering from either chronic asthma or chronic epilepsy.

There are thirteen questions in this self-report measure, with a 5-point response scale. For example, each child was asked, "How fair is it that you have asthma?" Children must answer from the range of responses of 'very fair', 'a little fair', 'not sure', 'a little unfair' or 'very unfair'. Higher scores reflect more positive attitudes associated with the condition, in this case, asthma. The scores from the thirteen items were summed and then divided by the total number of items or thirteen, thus giving a score that ranged between 1 and 5.

In terms of reliability, Austin & Huberty (1993) report the coefficient Cronbach alpha for the total scale to be 0.80. Item to total score correlations ranged from 0.27 to 0.59. In terms of validity, factor analysis supported one unitary construct measured by the scale, with factor loadings ranging from 0.33 to 0.84.

Test-retest reliability coefficients ranged from 0.51 to 0.62 over a two-week period. Attitudes were significantly negatively correlated with measures of depression, behaviour difficulties and psychosocial adaptation, suggesting support for the overall construct validity of the scale. At present there is no normative data for the scale and as such, further research regarding the scale is required. Nevertheless results of this study allowed comparison with the data collected from Austin & Huberty's (1993) original study as they developed this measure.

2.5.3 Revised Children's Manifest Anxiety Scale

This scale is a 37-item measure that assesses the level and nature of anxiety in children and adolescents, It was developed and revised by Reynolds & Richmond (1994) and is subtitled "What I Think and Feel". It is a self-report measure suitable

for children aged 6 to 18 years and can generally be administered in less than ten minutes.

The child is required to indicate a 'yes' or 'no' response to a series of statements regarding anxiety symptoms and anxiety provoking situations, such as "I worry a lot of the time" or "I am afraid of a lot of things". If they think the item applies to them then they circle 'yes' and receive a score of 1 for that item. The 'yes' responses are summed to give a total anxiety score, ranging from 0-37. The higher the score is then the higher the level of total anxiety.

The RCMAS is also designed to provide four further subscales, comprising physiological anxiety, worry/oversensitivity, social concerns/concentration and also a lie scale designed to identify children who may be under-reporting symptoms in order to 'fake good'. The present study concerns itself only with the total anxiety score.

Reynolds & Richmond (1994) report internal consistency for the total anxiety sore, producing a cronbach alpha of 0.83. Reliability estimates for the various subscales range from the 0.50s to the 0.80s. Reynolds (1981) reported a test-retest reliability coefficient of 0.68 for the total anxiety score in a sample of 534 children tested nine months apart. This supports the stability of the measure in the assessment of chronic anxiety. With regard to convergent validity, Reynolds & Richmond (1994) reported a correlation of 0.78 with the State-Trait Anxiety Inventory for Children (Spielberger, 1973). Further details of the studies investigating the psychometric properties of this scale can be found within the RCMAS manual (Reynolds & Richmond, 1994).

2.5.4 Children's Health Locus of Control Scale

The Children's Health Locus of Control Scale (CHLOC), designed by Parcel & Meyer (1978), is a 20-item self-report scale specifically intended to measure children's beliefs about their control over general and personal health issues. Therefore providing a measure of the extent of an internal or external locus of control for the child in relation to health issues. This scale, intended for children aged between 8 and 16 years of age, when administered, is designed to take no longer than ten minutes to complete.

Each item in the scale is a statement about factors influencing health, for example "I can do things to keep from getting sick". The child is required to respond by either indicating yes or no depending on whether they consider the statement to be true or false for himself or herself.

The scale has both unidimensional and multi-dimensional scoring formats. A factor analysis identified three factors which go to make up the multi-dimensional scale; the powerful others sub-scale, internal control sub-scale and chance control sub-scale. For the purposes of the present study the unidimensional method of scoring was used. The unidimensional scoring is two points per item if answered in the internal direction and one point if answered in the external direction, giving a total score of between 20 and 40 points. A high score on the overall locus of control total score ought to be indicative of a child who is more ready to take on adaptive health-related behaviours.

The study by Parcel & Meyer (1978) tested the internal consistency of the scale and found an overall reliability coefficient of 0.75, and a six-week test-retest reliability of 0.62. Construct validity of the scale is demonstrated in a replication study by O'Brien, Bush & Parcel (1989).

2.5.5 Asthma Self Efficacy Scales – Child and Parent Versions

The health beliefs and behaviours of both children and adults with chronic conditions are very important in terms of the efficacy of their self-management. To this end, Bursch et al. (1999) developed four new health belief measures for asthmatic children and their parents, which could be used for general use. The measures were titled Parent Barriers to Managing Asthma, Parent Asthma Self-Efficacy, Parent Treatment Self-Efficacy and Child Asthma Self-Efficacy. The current study used both the Child and Parent Self-Efficacy measures. These two scales were designed to measure specific self-management behaviours that covered both symptom prevention and symptom management. This design could be used as a means to recommend particular points where intervention would be useful in order to increase self-efficacy, especially for children and parents who were struggling unsuccessfully with asthma management.

Parent Asthma Self-Efficacy

The Parent Asthma Self-Efficacy scale has 12 items, and was designed to give a measure of total self-efficacy, whilst also providing subscale scores with regard to attack prevention and attack management. Items that specifically tackled attack prevention self-efficacy included a measure of the strength of the parents' beliefs that they could: use the medication for their child correctly, get their child to take the

medication, help their child to prevent a serious breathing problem and also avoid things they were allergic to. Attack management self-efficacy included items that measured the strength of the parents' beliefs that, in the event of a serious breathing problem (or asthma attack), they could: help their child to remain calm, control the symptoms, stop the symptoms from getting worse, decide which medications were appropriate to use, actually physically have inhalers with them and be able to decide when symptoms were no longer manageable at home and their child needed to be taken to the hospital emergency department.

Child Asthma Self-Efficacy

The Child Asthma Self-Efficacy scale has 14 items, again designed to give a total self-efficacy score, but was also designed to specifically assess attack prevention and attack management. Items that tackled attack prevention self-efficacy within the child's scale included measures of the strength of the child's beliefs that they were able to: get themselves to their next doctor's appointment, slow themselves down when they required to do so, learn asthma-management skills, have their inhalers with them, use their inhalers/medications correctly, ask someone to stop smoking, stay away from things they were allergic to and reduce the risks of having a serious breathing problem. Attack management self-efficacy items included measures of the strength of the child's beliefs that once they were experiencing a serious breathing problem (or asthma attack) they could: get the symptoms under control, stop the symptoms from getting any worse, stay calm, make a decision about which inhalers/medication to use, and decide when the symptoms could be safely managed at home and when they required emergency treatment from the hospital.

Scoring for both the parent and child measures requires individuals to indicate their responses to items on a 5-point range from 'not at all sure' (= 1) to 'completely sure' (= 5). A total score was formed and divided by the number of items in the questionnaire (i.e. 14 items in child's measure and 12 items in the parents' measure), to give a score in the range of 1-5, with the higher the score indicating higher levels of self-efficacy.

A total of 110 children (aged 7-15) and 129 parents took part in the original study by Bursch et al. (1999). Using Cronbach's alpha, very good internal consistency reliabilities were obtained for both the Parent Asthma Self-Efficacy Scale ($\alpha = 0.87$), and the Child Asthma Self-Efficacy Scale ($\alpha = 0.87$). Convergent and divergent methods were used to test construct validity, specifically by correlating the measures with each other and several other measures indicated in the original study. Indeed all measures were correlated in the hypothesised directions providing evidence for construct validity of the measures. Bursch et al. (1999) hypothesised, and subsequently found, that parent and child asthma self-efficacy were to be positively related to each other, and that child self-efficacy increases with the age of the child. These hypotheses were to be retested as a part of the current study.

2.5.6 Parent Asthma Knowledge Questionnaire

In order to assess parental knowledge of asthma, Fitzclarence & Henry (1990) developed and validated an asthma knowledge questionnaire for use with parents of children who have asthma. The questionnaire contained 31 questions covering all aspects of asthma. The majority of the items required a straightforward true or false response, for example: "Children with asthma have abnormally sensitive air passages

in their lungs" and "Parental smoking may make the child's asthma worse". A further six questions required brief written answers from the parents, for example: "What are the three main symptoms of asthma?" and "Write down some ways of helping prevent attacks of asthma during exercise".

Two pilot studies of the questionnaire were carried out to further ensure face and content validity of the measure. Concurrent validity was demonstrated by the ability of the questionnaire to distinguish low from high knowledge parents. The questionnaire also showed a high degree of reproducibility. The readability of this measure was assessed using Flesch's formula (Gilliland, 1972), resulting in parents requiring an IQ of 87 or more to be able to understand the questionnaire. This suggested that 80 per cent of the general community should have no difficulties in comprehending the items in this measure. The Parent Asthma Knowledge measure had a maximum possible score of 31, with one point being given for every correct answer.

2.5.7 Summary of measures yielded in this study

1. Age (years)
2. Gender (male/female)
3. Duration of asthma (years)
4. Severity of condition as perceived by parents (mild/moderate/severe)
5. Parents' Asthma Knowledge (range 0-31, with high scores indicating greater knowledge)
6. Parents' Asthma Self-Efficacy (range 1-5, with the higher the score indicating greater self-efficacy)

7. Children's Asthma Knowledge (range 0-20, with high scores indicating greater knowledge)
8. Child Asthma Self-Efficacy (range 1-5, with the higher the score being indicative of greater self-efficacy)
9. Child's Health Locus of Control (range 20-40, with high scores indicating greater internal health locus of control)
10. Revised Child Manifest Anxiety Scale (range 0-37, with higher scores indicating greater total anxiety)
11. Child Attitude to Illness Scale (range 1-5, with the higher the score being indicative of a greater positive attitude)

2.6 Statistical Analysis

Pearson correlations were used to test for associations between asthma self-efficacy, knowledge, and health locus of control, anxiety and attitudes to illness. Correlations were also performed on the parental measures, parental knowledge of asthma and parent self-efficacy. A number of demographic variables were also included in the correlational analysis. These included age and duration of illness. Scattergrams were performed to confirm that the relationships were linear and not affected by outlying cases. Any outliers were removed from further analysis.

Significance levels were set at $P \leq 0.05$ with a view to the exploratory nature of the study. All analyses for this study were carried out using the Statistical Package for Social Sciences for Windows, Version 10.0 (SPSS Inc, 1999).

3. RESULTS

The data collected was analysed in two stages:

1. exploration and description of the data;
2. confirmatory statistical analysis.

Exploratory Data Analysis

3.1Subjects

A total of 71 children with asthma and their parents participated in the study. The majority of the children were male (N = 40) as seen in Table 1.

Table 1

Sex of Child

	Frequency	Percent
male	40	56.3
female	31	43.7
Total	71	100.0

The children ranged from 7-15 years of age. A breakdown of the number of subjects in each age group is presented in Table 2. It can be seen that more than three quarters of the sample of children were less than 12 years of age and almost half of the sample less than 9 years of age. The mean age of the sample is 10.01 years (SD = 2.50).

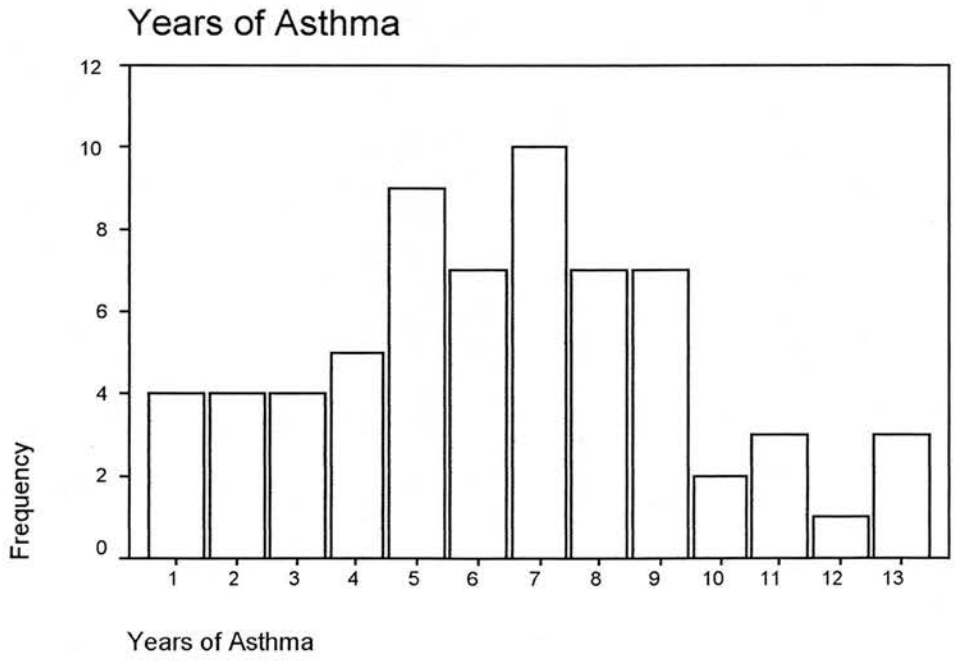
Table 2.

Age of Child

		Frequency	Percent
Age in years	7	16	22.5
	8	9	12.7
	9	10	14.1
	10	5	7.0
	11	11	15.5
	12	5	7.0
	13	7	9.9
	14	5	7.0
	15	3	4.2
	Total	71	100.0

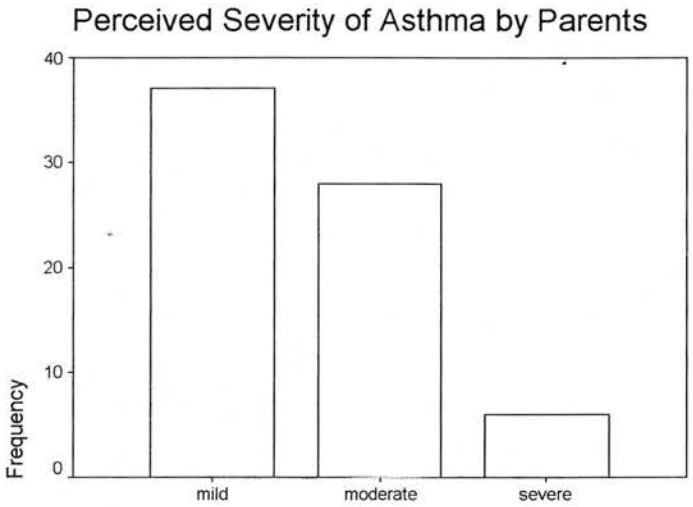
Children in the sample had asthma for a mean of 6.42 years, SD = 3.06 (median = 6.50 years), though this ranged from 1 up to 13 years in total as illustrated in Figure 1.

Figure 1.



For the most part, the parent who attended and participated in the research with their child was the mother (N = 63). In the remaining eight cases there were three instances where both parents attended, four cases with fathers alone and one case where the attending child's guardian and main carer was her grandmother. Parents (or guardians) were asked to rate their perception of the severity of their child's asthmatic condition as mild, moderate or severe. In this sample the majority of parents reported their child's asthma to be either mild (N = 37) or moderate (N = 28), with only six children perceived to have severe asthma (Figure 2).

Figure 2.



Perceived Severity of Asthma by Parents

3.2 Descriptive statistics for the measures used

The mean scores for the measures that were used with both children and their parents are presented in Table 3. The minimum and maximum results achieved by the sample are also reported. Using the standard deviations, it is possible to get an idea of the likelihood of any outlying or extreme values. Through further examination, using boxplots and histograms, a total of five cases were found to have outlying

values. These were subsequently removed for the second part of the analysis in an attempt to reduce the likelihood of error.

Table 3.

Mean scores on all measures

	N	Minimum	Maximum	Mean	Std. Deviation
Parents' Knowledge of Asthma scores	71	12	30	24.86	2.98
Parent Asthma Self-Efficacy scores	71	1.67	5.00	3.98	.65
Children's Asthma Knowledge scores	71	7	20	15.20	3.38
Child Asthma Self-Efficacy scores	71	1.50	4.57	3.45	.65
Children's Health Locu of Control scores	71	22	40	32.59	4.04
Revised Child Manifest Anxiety Scale scores	71	1	28	14.49	6.15
Child's Attitude to Illness Scale scores	71	1.62	4.77	3.34	.59

In this study, Parents' Knowledge of Asthma had a mean score of 24.9 of a possible 31; this replicates the findings of Fitzclarence and Henry (1990).

The Parent Asthma Self-Efficacy Scale mean of 3.98 also replicates the mean found (M = 3.94) in the original article devising the Self-Efficacy scales used in this study (Bursch et al, 1999).

Similarly, the mean found of 3.45 for the Child Asthma Self-Efficacy scale, approximates that found in the Bursch et al (1999) article, where mean = 3.70.

Rubin et al (1989), when using a sample with characteristics similar to the current study, to investigate the relationship between knowledge and behaviour in childhood asthma, reported a mean score of 31.8 for the Children's Health Locus of Control measure: this closely resembles the present study's finding of 32.6.

As can be seen in the Table 3, children correctly answered on average 15.2 items out of 21 on asthma knowledge, resulting in a mean score of 72.4 per cent, again closely resembling a score of 72.9 per cent items answered correctly as reported by Rubin et al (1989).

This study found the mean score for the Child Attitude Toward Illness Scale to be 3.34, similar to the mean (M = 3.44) found in the sample of children with asthma used in the development of the assessment tool (Austin & Huberty, 1993).

In summary, the mean scores on each of the measures replicate previous studies suggesting similar sample characteristics in the present study.

Confirmatory Statistical Analysis

3.3 Power analysis

Power for this study, with N = 71 and α = .05, two-tailed, is as follows: if the population r = .40, power equals .94; if population r = .30, power equals .72. To achieve power of .80, with a medium effect size and α = .05, this study would have required a sample size of 85 (Cohen, 1992). This number of subjects was aimed for throughout the study, although fell 14 subjects short of the total required. This was

both due to the difficulties in recruiting subjects and respondents, who had agreed to participate, not attending the testing sessions.

3.4 Hypotheses

Analyses were performed using a correlational strategy to explore relations among variables. Pearson correlations were used initially to test for associations between children's asthma self-efficacy, health locus of control, anxiety and attitudes to illness (Table 4). Correlations were then performed on the parental measures; parent asthma self-efficacy and parent knowledge of asthma with regard to children's asthma knowledge and self-efficacy (Table 5).

i. It was hypothesised that children who believe that their health is influenced by factors within their control will report that they feel more competent to manage their asthma when compared with children who believe that their health is determined by factors outwith their control. No significant relationship was found between children's asthma self-efficacy and children's health locus of control scores ($r = .07$; $p > .05$) as shown by the correlation analysis in Table 4.

ii. The hypothesis that children who hold positive attitudes towards their illnesses will report a greater sense of asthma self-efficacy than children who hold less positive attitudes was tested. No significant relationship was found between children's asthma self-efficacy and child's attitudes to illness scores, $r = .05$; $p > .05$ (Table 4).

iii. Children who report low levels of anxiety will report higher asthma self-efficacy than children with high anxiety formed the third hypothesis. Again no significant association was found between these two factors, $r = -.15$; $p > .05$ (Table 4).

Table 4.

Pearson Correlations between Children's Asthma Self-Efficacy, Health Locus of Control, Attitudes toward Illness and Anxiety

		Child Asthma Self-Efficacy scores	Children's Health Locus of Control scores	Child's Attitude to Illness Scale scores	Revised Child Manifest Anxiety Scale scores
Child Asthma Self-Efficacy scores	Pearson Correlation	1.00	.07	.05	-.15
	Sig. (2-tailed)	.	.57	.70	.24
	N	66	66	66	66
Children's Health Locus of Control scores	Pearson Correlation	.07	1.00	.09	-.42**
	Sig. (2-tailed)	1.00	.	.49	.00
	N	66	66	66	66
Child's Attitude to Illness Scale scores	Pearson Correlation	.05	.09	1.00	-.37**
	Sig. (2-tailed)	.70	.49	.	.00
	N	66	66	66	66
Revised Child Manifest Anxiety Scale scores	Pearson Correlation	-.15	-.42**	-.37**	1.00
	Sig. (2-tailed)	.24	.00	.00	.
	N	66	66	66	66

**. Correlation is significant at the 0.01 level (2-tailed).

iv. It was hypothesised that children, whose parents have greater knowledge of asthma, will report higher asthma self-efficacy than children whose parents have less knowledge of asthma. This hypothesis was not supported by the current study's findings, which found no significant relationship with parent asthma knowledge ($r = -.03$; $p > .05$) with regard to children's asthma self-efficacy (as shown in Table 5).

v. The hypothesis that children who have more knowledge about their asthma will report higher levels of asthma self-efficacy than children will with low levels of knowledge about their condition was tested. Table 5 shows that this relationship was not found in this case ($r = .05; p > .05$).

vi. Parent and child asthma self-efficacy were hypothesised to be positively related to one another. This study found no evidence to support this hypothesis, $r = .16; p > .05$ (Table 5).

Table 5.

Pearson Correlations between Children's Asthma Self-Efficacy, Parents' and Children's Asthma Knowledge and Parents' Asthma Self-Efficacy

		Child Asthma Self-Efficacy scores	Parents' Knowledge of Asthma scores	Children's Asthma Knowledge scores	Parent Asthma Self-Efficacy scores
Child Asthma Self-Efficacy scores	Pearson Correlation	1.00	-.03	.05	.16
	Sig. (2-tailed)	.	.79	.67	.19
	N	66	66	66	66
Parents' Knowledge of Asthma scores	Pearson Correlation	-.03	1.00	-.07	.41**
	Sig. (2-tailed)	.79	.	.57	.00
	N	66	66	66	66
Children's Asthma Knowledge scores	Pearson Correlation	.05	-.07	1.00	.06
	Sig. (2-tailed)	.67	.57	.	.61
	N	66	66	66	66
Parent Asthma Self-Efficacy Scores	Pearson Correlation	.16	.41**	.06	1.00
	Sig. (2-tailed)	.19	.00	.61	.
	N	66	66	66	66

**. Correlation is significant at the 0.01 level (2-tailed).

A final analysis was executed to discover whether any demographic variables, including age and duration of illness, were related to children's level of asthma self-efficacy (Table 6). As can be seen from this table, neither children's age

(r = .01; p > .05) nor duration of illness (r = .19; p > .05) showed any significant association to children's asthma self-efficacy.

Table 6.

Pearson Correlations between Children's Asthma Self-Efficacy, Age and Duration of Illness

		Child Asthma Self-Efficacy scores	Age of Child	Years of Asthma
Child Asthma Self-Efficacy scores	Pearson Correlation	1.00	.01	.19
	Sig. (2-tailed)	.	.95	.12
	N	66	66	66
Age of Child	Pearson Correlation	.01	1.00	.50**
	Sig. (2-tailed)	.95	.	.00
	N	66	66	66
Years of Asthma	Pearson Correlation	.19	.50**	1.00
	Sig. (2-tailed)	.12	.00	.
	N	66	66	66

**. Correlation is significant at the 0.01 level (2-tailed).

3.5 Summary of Results

The comparisons that were made with normative data and previously published findings for mean scores on the measures used, indicated that the majority of the sample, both children and parents, were similar and comparable with other samples of this kind.

There did not appear to be any significant relationships between children's asthma self-efficacy and any of the psychological variables considered, such as health locus of control, anxiety and attitudes toward illness. No significant relationship was found between children's level of asthma knowledge and their sense of competence to manage their asthma. This study also found that parental factors, including parent asthma knowledge and parent asthma self-efficacy, did not seem to be associated with children's level of asthma self-efficacy.

4. DISCUSSION

This section will begin by presenting the aims of the present research. A summary of the main findings of the research will then be provided, followed by suggestions of implications for clinical practice. Methodological issues will be discussed before making suggestions towards future research in this area. Concluding remarks will be given.

4.1 Aims of the Present Research

The present study was an attempt to identify psychological variables that might influence children's level of asthma self-efficacy, such as health locus of control, attitudes toward illness and anxiety. The relationship between children's level of asthma knowledge and their sense of competence to manage the illness was explored. The study also aimed to determine whether there were significant associations between children's asthma self-efficacy and parental factors, including parents' asthma knowledge and parent asthma self-efficacy.

4.2 Summary of the Main Findings

4.2.1 Comparisons with normative data

The comparisons that were made with normative data and previously published findings for mean scores on the measures used, indicated that the majority of the sample, both children and parents, were similar and comparable with other samples of this kind. The majority of the sample was found to be managing their asthma well and not having major adjustment difficulties to the condition. This finding is consistent with Eiser's assertions (1996), that most children with chronic conditions do not develop psychological problems.

Children's Health Locus of Control and Asthma Self-Efficacy

Creer in 1987 had suggested that the development of asthma self-efficacy resulted in a positive change in the locus of control that patients perceived regarding their condition and vice versa. Hence, the notion that significant changes in locus of control so patients come to believe themselves capable of managing aspects of their asthma. These positions have not been supported by the present research's findings. Miles et al. (1995) found that older children, children who were more intrinsically motivated to achieve healthy functioning, children whose parents were more knowledgeable about asthma management feel more competent to manage their asthma. These authors examined for any relationship between asthma self-efficacy and children's health locus of control. They found no relationship between these latter two factors. The current study confirmed this finding and found no relationship between children's health locus of control and children's asthma self-efficacy.

Anxiety and Asthma Self-Efficacy

In 1982, Kaptein suggested that patients who are highly anxious are the individuals who are least likely to be able to be able to manage their asthma. Kashani et al. (1988) noted that psychopathology is higher in children who have poor control over asthma. This might suggest that children with low self-efficacy would have associated higher levels of anxiety and hold negative attitudes towards their illness. Schlosser & Havermans (1992) also hypothesised that lower self-efficacy scores would be found in children who reported more anxiety and indeed their results confirmed presence of such a relationship. The results of the present study did not indicate any significant relationship between children's asthma self-efficacy and

anxiety, nor any association between asthma self-efficacy and children's attitudes towards their illness.

Parent Asthma Knowledge and Children's Asthma Self-Efficacy

Miles et al. (1995) found that children, whose parents were more knowledgeable about asthma management, feel more competent to manage their asthma. The current study did not support these findings.

Children's Asthma knowledge and Asthma Self-Efficacy

Schlosser & Havermans (1992) noted that knowledge has been described as an important determining factor in self-efficacy expectations, and thus hypothesised and went on to find that higher self-efficacy scores were associated with children who were well informed in facts about asthma and treatment. Rubin et al. (1989) found that children's accurate knowledge of asthma is related to performing in more asthma management skills but only up to a moderate level of knowledge, and is not sufficient to increase management behaviours alone. The present study has shown that a child having knowledge about their asthma does not necessarily mean that the individual will feel confident in their sense of competence to manage their condition. This finding follows on from Hilton et al. (1986) who suggested that knowledge about one's illness is not enough to change their behaviour.

Parent and Child Asthma Self-Efficacy

Bursch et al. (1999) found that parent and child asthma self-efficacy were positively correlated with one another ($r = .36$; $p < .01$). This study used the same measures as Bursch et al. and used a similarly aged sample, although with a slightly smaller

sample size. The current study did not find a similar relationship between child and parent asthma self-efficacy. However, when a post-hoc analysis is performed for children of eight years and over ($N = 50$), then a positive relationship between child and parent asthma self-efficacy is found ($r = .29; p < .05$).

Duration of Illness, Age and Asthma Self-Efficacy

Miles et al. (1995) found that older children felt more competent to manage their asthma. This study could not confirm this relationship, finding no significant association between age and children's level of asthma self-efficacy. This finding may suggest that children's sense of competence to manage their asthma may not be entirely concerned with chronological age only, but perhaps also with experience and understanding of illness.

Eksi et al. (1995) categorised children with asthma into groups according to the duration (less than 3 years) and long duration (3 or more years). The results of their study found there to be no relationship between duration of illness and psychological adjustment. This incorporated internalising, externalising, total problem and social competency scores for asthmatic children. The current study also found no relationship between duration of illness and children's sense of competency to manage their asthma, thus providing some evidence to support the previous study's findings.

4.2.2 Children's Asthma Self-Efficacy and Psychological Variables

There did not appear to be any significant relationships between children's asthma self-efficacy and any of the psychological variables considered, such as health locus of control, anxiety and attitudes toward illness.

Appropriate use and measurement of self-efficacy depends on conceptual clarity. It is therefore important to understand the differences between self-efficacy and a number of other concepts that are sometimes linked and often confused with it. Such concepts include health locus of control and anxiety. This confusion occurs, in part, because the personality traits, states and processes that these processes represent may, at some level, influence efficacy expectations or be influenced by them (Stretcher, McEvoy, Devillis, Becker & Rosenstock, 1986). It must be noted however, that the results of this study did not indicate any relationship between these conditions. Nevertheless if the belief remains that these concepts are in some way associated, it remains important to remember that this does not mean they are equivalent to self-efficacy.

Health Locus of Control

Health locus of control refers to a generalized expectation about whether one's health is controlled by one's own behaviour or by forces external to oneself. Health is an outcome, while self-efficacy focuses on beliefs about the ability to undertake behaviours that may or may not lead to desired outcomes (such as health). Bandura (1977b) illustrates the importance of the distinction between locus of control and self-efficacy by noting that the belief that outcomes (e.g. good health) are determined by one's own action can have any number of effects on self-efficacy and behaviour.

For example, people who view their health as personally determined but who believe they lack the skills needed to carry out the behaviours that would result in good health would experience low self-efficacy and approach these activities with a sense of incompetence. This would explain why no relationship was found between children's health locus of control and asthma self-efficacy.

With regard to self-efficacy in childhood asthma, it may be considered useful to have a degree of external locus of control. Take for example insulin-dependent diabetics. Because their health status is compromised by their medical condition, it is probably safe to assume that the diabetics would highly value being healthy. Therefore, the cognitions, which are most likely to predict, for example, adherence to their medication regimen, are most likely to be perceptions of control (Wallston, 1992). It is not, however, crucial, or even desirable, that a child conforms firmly to an internal locus of control orientation in order to stick to the regimen; adherence might also follow the belief that one's health care providers control one's health (an external belief). As long as an individual has faith in their health care providers, they would probably adhere to any regimen advocated by these providers. This pattern could be true for asthmatics. In fact, patients with chronic conditions such as asthma or diabetes might be most compliant if they entered into a partnership with their health care providers. A partnership, which combines internal health locus of control with belief in control by powerful others. This is particularly so for young children, who at an early developmental stage, may be overwhelmed by their situation and do not feel suitably able to completely control their illness on their own.

Treatment alliance, the ability of an individual and their physician to create a positive working relationship, is essential to optimal medical care. Treatment alliance allows the opportunity for a sense of shared goals and mutual positive regard, as well as decreasing the likelihood of negative behaviour that potentially could undermine the relationship and the treatment (Gavin, Wamboldt, Soprokin, Levy & Wamboldt, 1999).

Paediatric asthma literature strongly suggests the importance of the treatment alliance between families and their physicians. Sublett, Pollard, Kadlec &Karibo (1979) found that parental perceptions of poor parent-physician relationships were a major factor underlying adherence problems in asthmatic children presenting to hospital emergency departments. Other studies have demonstrated that conflict and communication difficulties between parents and physicians are associated with ineffective asthma management by the family (Wilson, Mitchell, Rolnick & Fish, 1993), and increased risk for child asthma mortality (Strunk, Mrazek, Fuhrman & LaBreque, 1985).

Anxiety

The concept of anxiety is not part of either the definition or the measurement of self-efficacy. Self-efficacy scales ask people to assess performance capabilities, not whether they can perform activities nonanxiously. However, anxiety results when people see themselves as ill-equipped to deal with difficult and potentially life threatening situations. Anxiety, in turn, may influence expectations of efficacy. Bandura (1977b) has demonstrated that high levels of physiological arousal inhibit self-efficacy and as a result, performance. Anxiety can result from perceived

inefficacy in the face of potentially injurious events, while depression occurs when people feel inefficacious at getting highly valued outcomes.

4.2.3 Children's Asthma Self-Efficacy and Children's Asthma Knowledge

No significant relationship was found between children's level of asthma knowledge and their sense of competence to manage their asthma. This finding indicates that there is a need to explore children and adolescents' attitudes and perceptions of life with asthma as well as providing education and advice. It may well be the case that children may be very knowledgeable about their condition but believe themselves to be incompetent at preventing and managing attacks.

4.2.4 Children's Asthma Self-Efficacy and Parental Factors

This study also found that parental factors, including parent asthma knowledge and parent asthma self-efficacy, did not seem to be associated with children's level of asthma self-efficacy. However, when analysis was performed only on children of age of 8 years and over ($N = 50$), then a significant positive relationship was found between children's asthma self-efficacy and parent asthma self-efficacy ($r = .29, p < .05$), which is then consistent with Bursch et al.'s (1999) findings.

Work on developmental aspects of children's understanding of health and illness, based on the work by Piaget (1929), suggests that children's concepts of illness progress through a systematic and predictable sequence of developmental stages which follow the pre-conceptual, concrete and formal operational stages of cognitive development (Biface & Walsh, 1981). Thus, children of different ages have different levels of understanding.

Parents' sense of competence to manage asthma may increase as they become increasingly confident that their children have more and more knowledge and self-management skills themselves to help prevent and manage attacks. Perhaps parents do not feel that younger children (< 8years) have enough experience, knowledge or skills to allow the parents to relax. On the other hand, because correlation does not imply causation, it may be that as parents become more confident of their sense of competency, this feeds through to their children who pick up on this and can learn to become confident about their asthma and it's management from their parents.

Given the child's dependency on their parents in most spheres, it is reasonable to expect parental influence on child asthma self-efficacy. Parents' values and their own approach to illness, physical symptoms, and health behaviour are modelled for their children on a daily basis. Even if parents do not themselves have asthma, their own patterns of dealing with symptoms and attacks inevitably affect their asthmatic child. Parents who are unusually focused on symptoms or, on the other hand, who ignore and deny symptoms to a high degree, may model an approach that is not helpful to a child's effort at successful asthma self-efficacy.

4.3 Clinical Implications

4.3.1 Listen to the children

Although the results of the current study did not support the experimental hypotheses, the measures themselves have yielded very rich information about a child's understanding, their beliefs and attitudes, their anxieties and their senses of

competence to manage their asthma. This highlights the importance of examining and listening to each individual child's perceptions about asthma. Gillespie (1990) stated that children should be listened to, with the result that the health care professional would be able to "...more fully-and successfully-treat the whole patient...win compliance...do more than alleviate symptoms...change the course of the disease itself". This is indeed a powerful statement, but the author is arguing for her belief in the importance of assessing the child's perception of asthma and its management, and not just taking the views and opinions of involved adults, whether parents, teachers or health staff. Gillespie believes that in doing so, the likelihood that children will accept and act upon advice regarding self-management will be increased, as well as improving and facilitating communication.

4.3.2 Usefulness of child-centred instruments

One reason for the development of child-centred instruments is, surely, the development of ways in which clinicians can 'listen to the children' and be aware of barriers to the optimal management of paediatric asthma. It is noted by Warner (1992) that optimal management of this condition should be within reach, given that international collaboration has developed comprehensive consensus statements, whereby both biomedical and psychosocial research contribute to the potential for significantly improved quality of life for children with asthma.

As described by Bursch et al. (1999), there are a number of ways that asthma self-efficacy scales can be employed. One of the main uses is to allow members of the health care professions and other interested parties involved in the field of asthma, to assess the confidence a child or their parent has in their ability to prevent

or manage an asthma attack. Health care professionals may repeatedly offer advice to patients about how they should manage their asthma; patients and more often children ignore such advice. It may be the case in some instances that children did not understand instructions given to them. The provision of asthma education, whether through specific programs or through clinician visits, usually shows that a significant increase in asthma knowledge has taken place. Thus, the problem may not be a lack of knowledge about what to do in preventing or managing an attack, but a perceived lack of self-efficacy in applying the knowledge.

The present study indeed did not find evidence of any significant association between children's level of asthma knowledge and asthma self-efficacy to indicate that one may affect the other. This is consistent with the view that a child may have all the knowledge about asthma and its management that is possible, but this does not predict the child's confidence that they can transform this knowledge into effective action. It is interesting however to note that such an association does exist between parents' level of asthma knowledge and parent asthma self-efficacy. This suggests that for children, knowledge is not enough to allow them to feel confident in their competence to manage their asthma but for adults/parents it does make an impact. Perhaps the fact that children remain dependent and have less experience of illness and life in general is what makes it harder to predict their confidence in specific situations.

As such, a second use of asthma self-efficacy scales is to identify specific situations in which patients are not confident about managing an attack. This information would be extremely useful when planning a treatment package. For example, if a

child rating scale indicated that a child was confident about managing attacks at home but not at school, or when attacks were triggered by interpersonal events or emotional stimuli, then this information would be incorporated into the treatment plan. A child with these difficulties could be taught to plan for attacks at school and to monitor emotional triggers. If the child appears to have satisfactory self-management abilities, but still has problems with confidence to carry out their skills, there may be other unforeseen difficulties to be dealt with. This might also indicate that the child requires practice and intensive support in performing self-management behaviours. Thus, it is possible to use the information from a self-efficacy rating scale to inform health professionals of specific problem areas that will need to be confronted during self-management training or treatment relapse.

4.3.3 Redirecting attention from parent to child

This study did not find any evidence that parents' level of asthma knowledge influenced either child's level of knowledge about the condition or their sense of competence to manage their asthma. This would suggest that health care professionals involved in the care of the asthmatic child redirect attention from parent to child. Often, as noted by Parcel et al. (1980) patient education for childhood asthma is largely directed towards parents. Given that this study is now over twenty years old it is clear that things have moved forward somewhat. However, attention should be redirected to interacting with children to help them understand their asthma and to know what they can do about it. Parcel et al. (1980) have noted that concepts of self-management can be introduced as early as five or six years of age. Information about the condition that is of increasing complexity can be gradually introduced as the child matures and develops more in depth understanding. This is

consistent with the current study's findings, that children's level of asthma knowledge increases as the child gets older and as the number of years of having asthma increase. Health care professionals should reinforce the attitude that children have control over their health and can care for themselves. The current study identified a strong association between children's asthma knowledge and children's health locus of control.

Variability in the results obtained among individual children, both in the current study and many others before it, emphasises the need to be aware of the unique requirements of each child. Health education for children with asthma should be integrated as an integral component of comprehensive medical care, focusing on prevention as well as crisis care. Children should learn more about their asthma at the time of their routine physician appointments and hospital or clinic visits. The physician and related asthma personnel can help children and parents in applying information and skills for their own specific situation. Reinforcement and feedback from the health care team is essential, if learning is to be translated into actual behaviour.

4.3.4 Personality traits

In line with previous findings, the current study has found that the course of asthma may be influenced by psychological factors. Specifically, some personality traits can differentiate between asthmatic patients with improved course and those without it.

The results of a study by Benedito-Monleon & Lopez-Andreu (1994) indicated the need to attend to the personality traits of asthmatic children and their mothers. These authors believed that the personality of asthmatic children and their mothers might be

an important factor in the course of their illness. Therefore, it should be considered in the management of asthmatic patients in order to modulate therapeutic effectiveness and to add efficacy to psychological treatments.

The potential implications of these findings for clinical practice are twofold. Firstly, therapists should select treatments for particular personality types. Secondly, therapists could apply psychological treatments in order to reduce the effects of some personality traits like anxiety, rigidity, neuroticism, or external control, whilst increasing the effect of others, such as extroversion, motivation or internal control. For example, an individual could be matched to therapies given their health locus of control (Foon, 1987). Those with internal health locus of control prefer nondirective therapy, whilst externals prefer directive therapy.

In order to optimise the effectiveness of treatment programs for asthmatic children, therapists should ensure that the personality of their patients is assessed, and known to other health care professionals working with these children, since the approach that workers take with a child should fit the personality traits of the individual. It may be that clinicians should not be too occupied solely with technique, as favourable personal conditions are an essential requirement for therapeutic change in asthma as they are in any other kind of illness.

Relationship between anxiety and children's health locus of control and children's attitudes toward illness indicates that improvement in anxiety management may promote other improvements such as increased internal locus of control and positive attitude toward illness, hence adjustment and coping. Psychologists may assist in

improving psychological health and overall adjustment, as well as the condition itself.

4.4 Methodological Issues

4.4.1 Sample size

Due to the time constraints of the study and the difficulty with recruiting subjects, the final number of children and their parents taking part was slightly smaller than had been initially planned for. A total of 71 subjects participated, which is itself a respectable number for this type of study. Nevertheless, as already stated, a total of 85 subjects would have been required to ensure that all medium and large effects would be realised. Thus, it is possible that the current study, whilst being well equipped to pick up large effects from the information gathered, may have lost some of the medium or small effects that may have been reported as significant had their been more subjects to report upon.

4.4.2 Correlational design

The use of correlational design allows only the measurement of the extent of which variables are related to each other. Correlational designs do not imply causation or causality. They are, merely, only able to suggest the strength of association. Hence this study, as an example, is not able to say categorically that anxiety causes negative attitudes to illness but can report that there is a significant association between these two factors. However, as suggested by Dadds (1995), correlational designs are still very important, as it is often not ethically or practically possible to execute rigorous experimental designs.

This study has the added complication of using a cross-sectional approach and hence, simply measured children and parents at one point in time. There are, of course the potential difficulties of only representing disadvantage or unmet need at one particular point in time when researchers make use of cross-sectional designs. For reasons such as these researchers have called for more longitudinal research designs to be employed in order to follow the psychological development and adjustment of children with chronic conditions (Wallender & Varni, 1998).

4.4.3 Lack of control group

This study used a single group. Eiser (1996) argued the importance of looking at differences within samples themselves rather than between groups. However the disadvantage with using a single group is, 'it is not possible to determine and discriminate between what may be general findings applicable to illness self-efficacy for all chronic conditions and those which are specific to asthma.

4.4.4 Measures

This study could be improved with the adoption of asthma self-efficacy measures whose psychometric properties have been validated on significantly larger populations and been demonstrated to evidence reliability through other studies. It is possible that the measure used for tapping children's asthma self-efficacy beliefs was simply not adequate enough. The items may not have engaged children's true beliefs about their abilities or captured the precise nature of beliefs that would determine subsequent management behaviour. It was also felt by the researcher when using this measure, that it would have been useful if some of the questions could have been more situation specific, and measured children's beliefs about their competence in

different contexts such as home and family, school, peer settings and so on. However, the information gained from this rating scale as it stands is very relevant to those involved in trying to increase children's confidence in their ability to manage their asthma and should not be dismissed.

Measures with limited scoring ranges can sometimes increase the likelihood of distributions being distorted, and may be less sensitive to more subtle differences within samples. As an example, the Children's Asthma Knowledge Questionnaire asked children to respond as either true or false. There was no option for "don't know" responses or otherwise. Thus, children who perhaps were guessing answers to this questionnaire, would have by probability, scored about half of these as correct.

Assessments in child health psychology have been reviewed by LaGreca & Lemanek (1996). They emphasise that assessment is a process and not just an application of a particular test or measure. A crucial question in this process is the appropriate selection of an informant. The optimal informant changes depending on the age of the child. For the child under the six years of age, the parents and the care providers are said to be the most appropriate. Between the ages of six and twelve years, parents or other care providers, teachers and the children themselves are reckoned to be the best choices. From the age of twelve years onwards, the adolescents and parents, but not the teachers, are thought to be the best informants. Generally, parents are assumed to be adequate as sources of information on observable aspects of the child's behaviour, but LaGreca & Lemanek (1996) suggest, they are less reliable as reporters on the child's internal states and social competencies. There is a place for peers and siblings as informants on peer relationships and social competencies. In

general, it is recognised that it is preferable to obtain data from multiple informants, including parents, teachers, siblings, health care personnel as well as children themselves. Similarly, multiple methods of measurement are to be encouraged. The combination of questionnaires, checklists, rating scales, interviews and direct observations are better than any single method. However, given the time scale of the current study, such optimal conditions were not possible. Given the nature of the study, the children were their own informants. Rating scales and questionnaires were the only methods employed, given their preferred and better psychometric work-up.

It must be remembered however that self-report data are subject to potential bias resulting from demand effects. There is the tendency for participants in an experiment to report results they believe are consistent with the desired outcomes. In an attempt to reduce this effect, the current study emphasised the confidentiality and anonymity of responses from health care professionals involved in the participants' care. It should also be noted that the current study does not have any information about non-responders. Although the sample used in this study seemed representative of the community in general, the possibility that those who did participate in the research were more highly motivated individuals to begin with, cannot be excluded.

4.4.5 Verbal and Cognitive abilities

Children participating in the research were very crudely screened for significant learning disabilities by asking parents if they were aware of any major difficulties their child had with understanding. The author also consistently went through the practice items for each measure with every child to further ensure that their ability to read and understand the items was adequate to continue with the assessment. None of the 71 children assessed appeared to have any difficulties with the reading or

comprehension of the test items. Nevertheless, this perhaps should have been more carefully and formally screened for, by using a quick measure of verbal ability such as the British Picture Vocabulary Scale (BPVS) – Short Form (Dunn, Dunn, Whetton & Pintilie, 1982). The BPVS is designed to measure acquired receptive vocabulary for Standard English. It is used with both pre and school-aged children to detect impairment and test scholastic aptitude. The test provides a non-threatening assessment tool as responses can be made by pointing and does not require the child to read or write. Scores of verbal ability could have been computed and used to screen out any children in the present study with low verbal ability and who may have found the rest of the test items challenging.

4.5 Future Research

The ideas presented below follow on from the present research as factors that ought to be considered in future research concerning children's level of asthma self-efficacy.

4.5.1 Condition Severity

The severity of children's asthma as perceived by parents was measured in this study. However, this data was used only for demographic detail in this instance and did not form part of the statistical analyses. Nevertheless, a study by Eiser, Eiser, Town & Tripp (1991), found that mothers and fathers differed in their ratings of how severely the child was affected. Neither did they agree about triggers that precipitated asthma attacks.

While there is no acceptable measure of severity, it has been shown that parental estimates of severity may have more far reaching consequences for the child's adjustment and parents' mental health than any more objective measure (Perrin et al, 1989).

Greater severity would be expected to be associated with an increase in stress-related situations (Kazak, 1989). For example, the more severely affected child might experience more hospitalisation and more treatment generally. Increased stress associated with these situations might be accompanied by a perception of increased stress in other situations. Parental perceptions of severity may also influence child-rearing practices by altering parents' perceptions of the child and their preparedness to implement stricter methods of control (Eiser et al, 1991).

In Eiser et al's study (1991), ratings of severity by mothers and fathers correlated with severity as assessed by medication. However, there was no relationship between mothers and fathers in their estimates of either the child's asthma severity or agreement about specific factors likely to trigger an asthma attack. Such discrepancies may have considerable implications for the parents' relationship and agreement about how to manage the child. Future research may consider the importance of family input and particularly could explore differences in parent behaviours as a function of beliefs about illness.

While the incidence of asthma in young children is relatively high, the range in severity of the condition is also very variable. Severity has been measured in a number of ways and may include objective indices such as frequency and number of

attacks, number of hospitalisations, or type of medication. More comprehensive measures of severity also need to take into account parental estimates, since these do not necessarily correspond well with more objective measures.

In future research, it may also be useful to include the asthmatic child's perception of the severity of their condition, and assess if this had any influence on children's perceived sense of competence to manage their asthma, or in fact matched parents' perceptions of severity.

Until a standardised measure of severity is available, it is inevitable that definitions of mild, moderate and severe asthma will vary between studies. Children categorised as severely affected in one study may well be categorised as mildly affected in another, depending on characteristics of the sample from which they are drawn.

Thus, parents' understanding of, and assessment of the severity of their child's asthmatic condition is likely to influence their perception of the child. This may have a knock-on effect the child's self-perception. Measures of severity, which take into account medical indices, as well as beliefs of parents and children, are necessary.

Future research in the area of children's level of asthma self-efficacy should assess if the severity of the condition has any impact on this. As stated the difficulty arises when one attempts to classify asthma severity. A study by Maclean, Perrin, Gortmaker & Pierre (1992) did not find any evidence of a relationship between severity of illness and behaviour problems in children with asthma. However, increased severity of asthma was associated with poorer social functioning in

children with the condition (Perrin, Maclean, & Perrin, 1989). Thus, it is unclear what function severity would have on children's asthma self-efficacy.

4.5.2 Functional Status

Rather than assessing medical severity however, several investigators have examined the relationship of children's functional status. Functional status may be defined as the capacity to perform age-appropriate roles and tasks, or adaptive functioning may be regarded in terms of personal self-sufficiency, community self-sufficiency and personal-social responsibility. Measuring condition related impairment in terms of functional status is a potentially useful way to approach severity. This is particularly the case as it can be used as a common measure to be employed across illnesses. Future studies investigating asthma self-efficacy may find this a worthy method of measurement with regard to level of condition severity experienced.

4.5.3 Family Functioning

Clinical experience demonstrates that many chronically ill children have an unstable course of illness ending in tertiary care, not because of extraordinary disease, but because they come from dysfunctional and neglectful households.

Matus (1981) concluded that family adjustment, rather than child adjustment, is the more powerful psychological influence on asthma management in the home. The roles of parental anxiety, parental apprehension, and parental hostility have all been

noted to complicate the management of asthma. Mrazek (1985) recognised the essential role family treatment plays in asthma management.

Reasons for family incapacity to manage illness include parents who deny or minimise symptoms, neglect to provide appropriate medical assistance, failure to support the child's self-care behaviour, failure to seek prompt care when indicated, allowing their own panic to influence treatment, or lack of intellectual, emotional and financial resources. Childhood asthma creates specific and severe demands on a family's resourcefulness. Given the importance of the family for a child with any chronic illness, and in this case asthma, it seems appropriate to investigate family functioning in terms of influencing a child's level of asthma self-efficacy, given that efficacy judgements may be enhanced by parent asthma self-efficacy for older children. One would predict that a dysfunctional family environment would also affect the younger child's asthma self-efficacy. This may not provide opportunity for learning and successful performance of asthma management behaviours, hence hindering the child's ability to increase their confidence or sense of competence to manage their condition. It may also be useful to consider a family's socio-economic status with regard to children's asthma self-efficacy.

4.5.4 Summary

In summary, further research in childhood asthma management should be encouraged to increase health care professionals' knowledge of the personality traits and behaviours of children of all ages that facilitate their care and prevent exacerbations of the condition. Research is required to increase knowledge of methods to encourage the acquisition and retention of effective health behaviours,

and refine educational programs so that they are both as effective and efficient as possible in improving children and parent health behaviours. Hence, reducing asthma-related morbidity and mortality.

4.6 Concluding Remarks

Childhood asthma is a chronic condition affecting up to one in every seven children. Self-management programs have the potential to offer an important means of helping children and their families both deal with and manage their asthma. The present study attempted to identify and understand the interaction between psychological factors that influence children's sense of competence to manage asthma.

Bearing in mind the methodological issues discussed, this study found that, while the sample was considered as a whole, none of the experimental hypotheses regarding the contribution of psychological factors to children's asthma self-efficacy were supported.

Asthma self-efficacy scales appear to be a very useful way of identifying specific problem areas and planning individualised treatment plans in the course of improving children's self-management skills.

The importance of tending to personality traits, such as anxiety and children's health locus of control, to both forecast and improve the effectiveness of psychological treatment has been discussed. The significance of assessing and listening to the child's views in the management of their illness has also been highlighted throughout this study.

It is indicated that future research in the field of children's asthma self-efficacy ought to take account of developmental stages, family functioning, condition severity or functional status.

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LIST OF APPENDICES

Appendix 1: Information Sheet for Parents

Parents' Research Information Sheet

Self-Efficacy in Childhood Asthma

As a parent of a child with asthma we would be very grateful if you and your child would consider participating in the following study. This study is designed to learn more about children and parents' sense of competence to manage the child's asthmatic condition. We are interested in finding out how much children and their parents know about asthma and how this affects their ability to take control of their condition.

Sometimes children and their families have difficulty managing the child's asthma. This study will be asking children questions about their sense of control over their health, what they believe to be true about their health and also about any feelings of anxiety that they may have. This will help us to see if these factors are important in managing childhood asthma. This information will help guide us in the future when faced with children who are having difficulty coping with their asthmatic condition.

If you and your child would like to take part in the study please complete and return the detachable slip in the enclosed stamp addressed envelope or telephone the number given below. An appointment will then be arranged at your convenience, lasting a maximum of 40 minutes, with Tracy Slater, Trainee Clinical Psychologist and Principal Researcher. At the appointment, you will be given more information about the study and Miss Slater will answer any questions you may have about it. If you and your child are happy to continue, your child will be asked a series of questions about himself/herself and their asthma, whilst you will be asked to complete two questionnaires. There are no right or wrong answers, although you can ask for clarification of any part that seems difficult. Your participation is entirely voluntary and should you decide not to take part, this will not have any effect on your child's future care.

Any information that you give us will be treated as strictly confidential and nothing that could identify you or your child will be published in any form. Questionnaires will be kept only for the period of the research (approximately 8 months) and then destroyed once the research is completed. A copy of the results will be available at the asthma clinic if you wish to obtain these.

If you have any questions, you can contact the principal researcher or Dr. Chris Wiles, clinical psychologist and research supervisor. We would gratefully value your contribution to this study, as it will give us a much better understanding of factors affecting children's sense of competence to manage their asthma when faced with difficulties in doing so.

For more information please contact: -

Miss Tracy Slater
Principal Researcher
The Rowan Centre
Maryhill, Elgin
01343 567399

Dr. Chris Wiles
Research Supervisor
The Rowan Centre
Maryhill, Elgin
01343 567399

Thank you for your help

Appendix 2: Information Sheet for Children

Children's Research Information Sheet

Managing Asthma

As a young person with asthma we would be very grateful for your help in the following study.

You may know how important it is to take the medicine from your inhalers. This study would like to see how much children and their parents know about asthma and how able they feel about controlling their asthma - even when they have asthma attacks.

If you decide that you would like to take part in this project you will be asked some questions about asthma. You will also be asked some questions about yourself and how you feel about your health. Your parents will also be asked some questions about how much they know about asthma.

There are no right or wrong answers to the questions and someone will be there to help you with any questions that you find difficult. Nobody else will find out the answers that you give so you can answer as honestly as possible.

If you decide that you would like to take part in this study an appointment will be set up for you and your parents with the researcher, Tracy Slater. If you have any questions you will be able to ask them at this appointment. You will then be asked the questions that have been described. The whole appointment will last no longer than 40 minutes.

Thank you very much for considering taking part in this project. Taking part is voluntary and you can stop at any time.

Tracy Slater
Researcher

Appendix 3: Consent Form

The Rowan Centre
Maryhill, High Street, Elgin, IV30 1AT.
Tel: (Direct Line) 01343 567399 Fax: 01343567699

Consent Form for Children and Parents

Name of Child: _____

Name of Parent: _____

Name of Study: Self-Efficacy in Childhood Asthma

Principal Researcher: Tracy Slater_____

My child and I have read the patient/volunteer information sheet on the above study and have had the opportunity to discuss the details with Ms. Tracy Slater and ask questions. The researcher has explained to my child and I the nature and purpose of the questionnaires to be completed. I understand fully what is proposed to be done.

My child and I have agreed to take part in the study as it has been outlined to me, but I understand that we are completely free to withdraw from the study or any part of the study at any time we wish and that this will not affect my child's continuing medical treatment in any way.

My child and I understand that the questionnaires issued to us are part of a research project designed to promote medical and psychological knowledge, which has been approved by the Grampian Research Ethics committee, and may be of no benefit to my child or I personally. The Grampian Research Ethics Committee may wish to inspect the data collected at any time as part of its monitoring activities.

My child and I hereby fully and freely consent to participate in the study which has been fully explained to me.

Signature of Child: .....

Signature of Parent: .....

Date:.....

I confirm that I have explained to the child and parent named above, the nature and purpose of the questionnaires to be completed.
Signature of Researcher:.....

Date:.....

Appendix 4: Parent Asthma Knowledge Questionnaire

Asthma Knowledge Questionnaire

1. *What are the three main symptoms of asthma?*

2. *More than 1 in 10 children will have asthma at some time during their childhood* — *True* *False*

3. *Children with asthma have abnormally sensitive air passages in their lungs* — *True* *False*

4. *If one child in a family has asthma then all his/her brothers and sisters are almost certain to have asthma as well* — *True* *False*

5. *Most children with asthma have an increase in mucus when they drink cow's milk* — *True* *False*

6. *Write down all the things you know that cause asthma (sometimes called trigger factors)*

7. *During an attack of asthma the wheeze may be due to muscles tightening in the wall of the air passages in the lungs* — *True* *False*

8. *During an attack of asthma the wheeze may be due to swelling in the lining of the air passage in the lungs* — *True* *False*

9. *Asthma damages the heart* — *True* *False*

10. *Write down two asthma treatments (medicines) which are taken every day on a regular basis to prevent attacks of asthma from occurring*

11. *What are three asthma treatments (medicines) which are useful during an attack of asthma*

12. *Antibiotics are an important part of treatment for most children with asthma* — *True* *False*

13. *Most children with asthma should not eat dairy products* — *True* *False*

14. *Allergy injections cure asthma* — *True* *False*

15. *If a person dies from an asthma attack, this usually means that the final attack must have begun so quickly that there was no time to start any treatment* — *True* *False*

16. *People with asthma usually have 'nervous problems'* — *True* *False*

17. *Asthma is infectious (i.e. you can catch it from another person)* — *True* *False*

18. *Inhaled medications for asthma (e.g. Ventolin puffers, rotacaps) have fewer side effects than tablets* — *True* *False*

19. *Short courses of oral steroids (such as prednisolone) usually cause significant side effects* — *True* *False*

20. *Some asthma treatments (such as Ventolin) damage the heart* — *True* *False*

21. *A 5-year-old boy has an attack of asthma and takes two puffs of Ventolin from a puffer (metered dose inhaler). After 5 minutes he is no better. Give some reasons why this might have happened.*

22. *During an attack of asthma, which you are managing at home, your child is requiring the nebulizer (mask) every 2 hours. He/she is gaining benefit but is breathless after 2 hours. Provided that he/she doesn't get any worse, it is fine to continue with 2 hour treatments* — *True* *False*

23. *Write down ways of helping to prevent attacks of asthma during exercise*

24. *Children with asthma become addicted to their asthma drugs* — *True* *False*

25. *Swimming is the only suitable exercise for asthmatics* — *True* *False*

26. *Parental smoking may make the child's asthma worse* — *True* *False*

27. *With appropriate treatment most children with asthma should lead a normal life with no restrictions on activity* — *True* *False*

28. *The best way to measure the severity of a child's asthma is for the doctor to listen to his/her chest* — *True* *False*

29. *Asthma is usually more of a problem at night than during the day* *True* *False*

30. *Most children with asthma will have stunted growth* *True* *False*

31. *Children with frequent asthma should have preventive drugs* *True* *False*

Appendix 5: Parent Asthma Self-Efficacy Scale

Parent Asthma Management Self-Efficacy

	Not at all sure	*A little bit sure*	*Fairly sure*	*Quite sure*	*Completely sure*	*Does not apply*
1. How sure are you that you can get your child to take his/her medications?	*1*	*2*	*3*	*4*	*5*	*8*
2. How sure are you that you can use the medication correctly?	*1*	*2*	*3*	*4*	*5*	*8*
3. How sure are you that you can get your child to a doctor's appointment?	*1*	*2*	*3*	*4*	*5*	*8*
4. How sure are you that you can follow the directions for giving medication to your child?	*1*	*2*	*3*	*4*	*5*	*8*
5. How sure are you that you can help your child avoid things he/she is allergic to?	*1*	*2*	*3*	*4*	*5*	*8*
6. How sure are you that you can help your child prevent a serious breathing problem?	*1*	*2*	*3*	*4*	*5*	*8*
7. How sure are you that you can have inhalers with you if your child has a serious breathing problem?	*1*	*2*	*3*	*4*	*5*	*8*
8. How sure are you that you can control a serious breathing problem at home rather than take your child to ER?	*1*	*2*	*3*	*4*	*5*	*8*

9. How sure are you that you can keep the asthma from getting worse if your child starts to wheeze or cough?	*1*	*2*	*3*	*4*	*5*	*8*
10. How sure are you that you would know which medications to use when your child is having a serious breathing problem?	*1*	*2*	*3*	*4*	*5*	*8*
11. How sure are you that you know when your child's breathing problem can be controlled at home?	*1*	*2*	*3*	*4*	*5*	*8*
12. How sure are you that you know when to take your child to the emergency room during a serious breathing problem?	*1*	*2*	*3*	*4*	*5*	*8*

How old is your child? _____

How old was he/she when diagnosed with asthma? _____

How would you describe your child's asthmatic condition? (please tick)

Mild ☐

Moderate ☐

Severe ☐

Appendix 6: Children's Asthma Knowledge Questionnaire

Asthma Health Education Program

If you have asthma:

1. *You are always sick* _____ *True* *False*
2. *Your body parts for breathing sometimes do not work right* _____ *True* *False*
3. *You should not talk about your feelings, such as being afraid, angry or worried* _____ *True* *False*

Asthma attacks can happen because:

4. *You can be allergic to things like dust, pollen or animals* _____ *True* *False*
5. *You breathe things like paint fumes, gasoline, smoke or pollution* _____ *True* *False*

Doing something to keep an asthma attack from happening:

6. *Is not possible* _____ *True* *False*
7. *Might be possible by staying away from things that cause attacks* _____ *True* *False*
8. *Is something only a doctor can do something about* _____ *True* *False*

Taking asthma medicine for wheezing:

9. *Can be used to keep an asthma attack from happening* _____ *True* *False*
10. *Can be used to stop an asthma attack after it gets started* _____ *True* *False*
11. *Is something children can learn to do to help themselves* _____ *True* *False*
12. *Is to relax the tightness in the tiny air tubes (bronchioles)* _____ *True* *False*

If you start to have an asthma attack:

13. *You might notice coughing before wheezing starts* _____ *True* *False*
14. *You might notice a tight feeling in your chest before wheezing starts* _____ *True* *False*
15. *You should only take medicine after you start wheezing* _____ *True* *False*

When you have an asthma attack:

16. *You can do nothing to try to stop the attack* _____ *True* *False*
17. *Your parents must rush you to the hospital before doing anything else* _____ *True* *False*
18. *You can relax by doing breathing exercises* _____ *True* *False*
19. *You should try not to pay attention to wheezing and hope that it will go away* _____ *True* *False*
20. *You should drink lots of liquids like water* _____ *True* *False*

Appendix 7: Child Asthma Self-Efficacy Scale

PATIENT QUESTIONNAIRE
Asthma Self-Management Beliefs

To be filled out by Asthma Patients 8 – 17 years of age

How old are you? _____

Are you:

Male ☐

Female ☐

Instructions
The questions are about how sure you are that you can do things to help your asthma. There are no right or wrong answers. This is not a test. Please circle the answer that is most true for you. If the answer doesn't make sense for you, please circle "8".

	Not at all sure	*A little bit sure*	*Fairly sure*	*Quite sure*	*Completely sure*
1. How sure are you that you can have inhalers with you the next time you have a serious breathing problem?	*1*	*2*	*3*	*4*	*5*
2. How sure are you that you can use your inhaler correctly?	*1*	*2*	*3*	*4*	*5*
3. How sure are you that you can prevent a serious breathing problem?	*1*	*2*	*3*	*4*	*5*
4. How sure are you that you can get to your next doctor's appointment?	*1*	*2*	*3*	*4*	*5*
5. How sure are you that you can slow yourself down to prevent serious breathing problems?	*1*	*2*	*3*	*4*	*5*
6. How sure are you that you can avoid things you are allergic to?	*1*	*2*	*3*	*4*	*5*
7. How sure are you that you can learn the skills you need to control your asthma?	*1*	*2*	*3*	*4*	*5*
8. If someone near you was smoking, how sure are you that you could ask them to stop?	*1*	*2*	*3*	*4*	*5*

	Not at all sure	*A little bit sure*	*Fairly sure*	*Quite sure*	*Completely sure*
9. How sure are you that you can control a serious breathing problem yourself rather than go to the emergency room?	*1*	*2*	*3*	*4*	*5*
10. How sure are you that you can keep your asthma from getting worse if you start to have symptoms such as wheezing or coughing?	*1*	*2*	*3*	*4*	*5*
11. How sure are you that you can stay calm during a serious breathing problem?	*1*	*2*	*3*	*4*	*5*
12. How sure are you that you know which medications to use during a serious breathing problem?	*1*	*2*	*3*	*4*	*5*
13. How sure are you that you can tell when a serious breathing problem can be controlled at home?	*1*	*2*	*3*	*4*	*5*
14. How sure are you that you know when you should go to the hospital emergency room during a serious breathing problem?	*1*	*2*	*3*	*4*	*5*

Appendix 8: Children's Health Locus of Control Scale

CHILDREN'S HEALTH LOCUS OF CONTROL SCALE

We would like to learn about different ways children look at their health. Here are some statements about health or illness (sickness). Some of them you will think are true and so you will circle YES. Some of them you will think are ***not*** *true and so you will circle NO. Even if it is very hard to decide, be sure to circle YES or NO for* ***every*** *statement.* ***Never*** *circle both YES and NO for one statement. There are no right or wrong answers. Be sure to answer the way you really feel and* ***not*** *the way other people might feel.*

PRACTICE: Try the statement below.

a. Children can get sick.

If you think this is true, circle *Yes*
If you think this is not true, circle *No*

b. Children never get sick.

If you think this is true, circle *Yes*

If you think this is not true, circle *No*

Try one more statement for practice.

c. When I am not sick, I am healthy. *Yes* *No*

Now turn over this page and answer the questions in just the same way.

1. *Good health comes from being healthy* _____ *Yes* *No*
2. *I can do things to stop myself from becoming sick* _____ *Yes* *No*
3. *Bad luck makes people sick* _____ *Yes* *No*
4. *I can only do what the doctor tells me to do* _____ *Yes* *No*
5. *If I get sick, it is because getting sick just happens* _____ *Yes* *No*
6. *People who never get sick are just plain lucky* _____ *Yes* *No*
7. *My mother must tell me how to keep from getting sick* _____ *Yes* *No*
8. *Only a doctor or a nurse keeps me from getting sick* _____ *Yes* *No*
9. *When I am sick, I can do things to get better* _____ *Yes* *No*
10. *If I get hurt it is because accidents just happen* _____ *Yes* *No*
11. *I can do many things to fight illness* _____ *Yes* *No*
12. *Only the dentist can take care of my teeth* _____ *Yes* *No*
13. *Other people must tell me how to stay healthy* _____ *Yes* *No*
14. *I always go to the nurse right away if I get hurt at school* _____ *Yes* *No*
15. *The teacher must tell me how not to have accidents at school* _____ *Yes* *No*
16. *I can make many choices about my health* _____ *Yes* *No*
17. *Other people must tell me what to do when I feel sick* _____ *Yes* *No*
18. *Whenever I feel sick I go to see the school nurse right away* _____ *Yes* *No*
19. *There are things I can do to have healthy teeth* _____ *Yes* *No*
20. *I can do many things to prevent accidents* _____ *Yes* *No*

Appendix 9: Revised Child Manifest Anxiety Scale

Revised Child Manifest Anxiety Scale (RCMAS)

WHAT I THINK AND FEEL

DIRECTIONS

Here are some sentences that tell how some people think and feel about themselves. Read each sentence carefully. Circle the word "Yes" if you think it is true about you. Circle the word "No" if you think it is not true about you. Answer each question even if some are hard to decide. Do not circle "Yes" and "No" for the same sentence.

There are no right or wrong answers. Only you can tell us how you think and feel about yourself. Remember, after you read each sentence, ask yourself "Is this true about me?" If it is, circle "Yes". If it is not, circle "No".

Now turn over this page and try the statements on the next page.

1. *I have trouble making up my mind* _____ *Yes* *No*
2. *I get nervous when things do not go the right way for me* _____ *Yes* *No*
3. *Others seem to do things easier than I can* _____ *Yes* *No*
4. *I like everyone I know* _____ *Yes* *No*
5. *Often I have trouble getting my breath* _____ *Yes* *No*
6. *I worry a lot of the time* _____ *Yes* *No*
7. *I am afraid of a lot of things* _____ *Yes* *No*
8. *I am always kind* _____ *Yes* *No*
9. *I get mad easily* _____ *Yes* *No*
10. *I worry about what my parents will say to me* _____ *Yes* *No*
11. *I feel that others do not like the way I do things* _____ *Yes* *No*
12. *I always have good manners* _____ *Yes* *No*
13. *It is hard for me to get to sleep at night* _____ *Yes* *No*
14. *I worry about what other people think about me* _____ *Yes* *No*
15. *I feel alone even when there are people with me* _____ *Yes* *No*
16. *I am always good* _____ *Yes* *No*
17. *Often I feel sick in my stomach* _____ *Yes* *No*
18. *My feelings get hurt easily* _____ *Yes* *No*
19. *My hands feel sweaty* _____ *Yes* *No*
20. *I am always nice to everyone* _____ *Yes* *No*
21. *I am tired a lot* _____ *Yes* *No*
22. *I worry about what is going to happen* _____ *Yes* *No*
23. *Other people are happier than I* _____ *Yes* *No*
24. *I tell the truth every single time* _____ *Yes* *No*
25. *I have bad dreams* _____ *Yes* *No*
26. *My feelings get hurt easily when I am fussed at* _____ *Yes* *No*
27. *I feel someone will tell me I do things the wrong way* _____ *Yes* *No*
28. *I never get angry* _____ *Yes* *No*
29. *I wake up scared some of the time* _____ *Yes* *No*
30. *I worry when I go to bed at night* _____ *Yes* *No*
31. *It is hard for me to keep my mind on my school work* _____ *Yes* *No*
32. *I never say things that I shouldn't* _____ *Yes* *No*
33. *I wiggle in my seat a lot* _____ *Yes* *No*
34. *I am nervous* _____ *Yes* *No*
35. *A lot of people are against me* _____ *Yes* *No*
36. *I never lie* _____ *Yes* *No*
37. *I often worry about something bad happening to me* _____ *Yes* *No*

Appendix 10: Child Attitude Toward Illness Scale

Child Attitude Toward Illness Scale (CATIS)

Here are 13 questions that ask about you and your feelings. Read each one carefully. If there is anything that you do not understand, please ask me about it. For each question, put a tick mark (✓) below the response that best describes your feelings. Answer ***EVERY*** *question even if some are hard to decide, but tick only* ***ONE*** *answer. There are no right or wrong answers. Only* ***YOU*** *can tell us how you feel, so we hope that you will mark the way you* ***REALLY*** *feel inside.*

1. *How good or bad do you feel it is that you have asthma*

Very Good	*A Little Good*	*Not Sure*	*A Little Bad*	*Very Bad*

2. *How fair is it that you have asthma*

Very Fair	*A Little Fair*	*Not Sure*	*A Little Unfair*	*Very Unfair*

3. *How happy or sad is it for you to have asthma*

Very Sad	*A Little Sad*	*Not Sure*	*A Little Happy*	*Very Happy*

4. *How bad or good do you feel it is to have asthma*

Very Good	*A Little Good*	*Not Sure*	*A Little Bad*	*Very Bad*

5. *How often do you feel that your asthma is your fault*

Never	*Not Often*	*Sometimes*	*Often*	*Very Often*

6. *How often do you feel that your asthma keeps you from doing things you like to do*

Very Often	*Often*	*Sometimes*	*Not Often*	*Never*

7. *How often do you feel that you will always be sick*

Never	*Not Often*	*Sometimes*	*Often*	*Very Often*

8. *How often do you feel that your asthma keeps you from starting new things*

Very Often	*Often*	*Sometimes*	*Not Often*	*Never*

9. How often do you feel different from others because of your asthma

Never	*Not Often*	*Sometimes*	*Often*	*Very Often*

10. How often do you feel bad because you have asthma

Very Often	*Often*	*Sometimes*	*Not Often*	*Never*

11. How often do you feel sad about being sick

Never	*Not Often*	*Sometimes*	*Often*	*Very Often*

12. How often do you feel happy even though you have asthma

Never	*Not Often*	*Sometimes*	*Often*	*Very Often*

13. How often do you feel just as good as other kids your age even though you have asthma

Very Often	*Often*	*Sometimes*	*Not Often*	*Never*

*Family Number*_____